A THEOLOGY OF CHRISTIAN REVELATION
BASED UPON
MICHAEL POLANYI'S INTERPRETATION OF SCIENTIFIC DISCOVERY

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ABSTRACT

This dissertation begins by considering scientific objectivism and religious supernaturalism relative to the accreditation of knowledge. From the perspective of Michael Polanyi, these claims are shown to be, at best, elliptical formulations; at their worst, dangerously misleading. There follows an exposition of the organismic, sociological and epistemological processes of Michael Polanyi's philosophy of personal knowledge. Within these parameters, a preliminary sketch is constructed which endeavors to describe and accredit both scientific and religious knowing as based upon tacit skills which, in turn, form the same self-moving and self-satisfying organismic powers. The critical importance of the apprenticeship for acquiring and sharing tacit skills is emphasized.

Relying upon this preliminary sketch, the second chapter is devoted to criticizing five claims whereby scientific knowing has been fallaciously distinguished from religious knowing. The five claims, which are undercut by appealing to the history and philosophy (Polanyi's) of scientific discovery, are the following: (1) the receptive and non-authoritarian scientific attitude, (2) the impersonal and impassionate scientific judgment, (3) the irreducible and presuppositionless scientific facts, (4) the indisputable and reproducible experimental testing, and (5) the more-recent pragmatic accreditation of scientific assertions.

Relying both upon the preliminary sketch of chapter one and the neutralization of the inhibiting misconceptions treated in chapter two,

chapter three goes on to construct a fresh theology of Christian revelation. The new construction is spelled out in five theses. The first two theses account for the acquisition and operation of religious faith within the same parameters as Polanyi uses to describe the acquisition and operation of the tacit presuppositions of the scientific enterprise. The third thesis relies upon Polanyi's description of the process for discovering and accrediting new knowledge in science to spell out a parallel process for discovering and accrediting new manifestations of the living God. In effect, therefore, Christian revelation is shown to be the functional counterpart of scientific discovery. The fourth and fifth theses develop Polanyi's insistence that some over-arching cosmic field must necessarily guide cosmogenesis, phylogenesis and ontogenesis. The irreducible tension which the recognition of the cosmic field creates between the already and the not-yet is specified as the central tenet ritualized and celebrated by the Christian community under the rubric of the Kingdom of God. Within this perspective, the heritage of the Christian community bears directly upon the preservation and transmission of those tacit skills originating in Jesus whereby his disciples are enabled to correctly recognize the creative inbreaking of God in history and to effectively harmonize their performance skills in response to that inbreaking.

PREFACE

Many have asked me to describe the topic of my dissertation. Generally I try to tailor the response to the person asking the question. On route to California, for instance, an attractive woman, recently divorced and an avid reader of Ms., asked me this question. I responded by saying that most Christians consider that the judgments expressed in the New Testament relative to marriage and sexual roles are divinely and eternally normative. My dissertation, on the other hand, would favor the view that the New Testament represents the normative accounts of the sexual roles[1] which animated the early disciples of Jesus. Following the first century, however, I contend that Christians have been inspired to enlarge and transmute but also to codify and fossilize the primitive traditions expressed in the canon of Scriptures. In fact, I further suggest that the life-giving dimensions of the current Women's Liberation might indeed be discerned as an instance of God's continued presence in our modern world, and, therefore, while seemingly secular in its immediate inspiration, might be of grave religious concern. The next half-hour was filled with a fascinating exchange relative to the religious implications of of Women's Liberation.

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[1] While the sexual roles of primitive Christianity is not enlarged upon in my dissertation, I do contend that Jesus did disrupt the Pharisaical Jewish tradition of his time on the basis of his own fresh discovery of the God of his Jewish forefathers.

Returning from California, my modern dance instructor asked me to describe my thesis. I told him that my concern was to show that the Christian comes to accept God in much the same way as a scientist accepts electrons. Both require training from teachers who stand in a tradition. The training opens up new vistas which rely upon sophisticated skills such that the scientist knows how to enter into an experiment so as to correctly perceive electronic activity, and the Christian knows how to enter into sacred rituals so as to correctly perceive God's activity. Furthermore, I explained that the scientist learns to discover new manifestations of the electron in much the same way that the Christian learns to anticipate and discern new manifestations of God. As a result, I try to show that apprenticeship and discovery play parallel roles in both the scientific and religious enterprise.

Faced with the same inquiry as presented by the five professors comprising the committee examining my dissertation, I prefaced my responses by two considerations: (1) Historically I noted that the prevailing tradition from Augustine to Bonaventure insisted that the same process of illumination was to account for all modes of knowing. From the time of Thomas Aquinas to the present, however, it has become acceptable to distinguish two distinct processes: reason and revelation. I explained, then, that Polanyi calls for a return to a unified account which embraces both science and religion. I suggested that Polanyi does this by showing that passion and authority (which were commonly admitted as inappropriate in science) have necessary functional roles in the scientific enterprise. Conversely, free inquiry and democratic persuasion have legitimate roles within Christianity; (2) From a personal perspective, I noted that my training as a physicist has continually been at odds with my training as a Roman Catholic. Polanyi has offered me a framework wherein the divergence between the two is overcome such that I now consider that the reliability of my Christian affirmations is founded upon the same processes which undergird my current scientific affirmations.

Against this background, I explained to my examining committee that my task in this dissertation has been to generate a consistent and appealing description of the knowing processes operative within Christian revelation from within Polanyi's generalized philosophy of personal knowing. By way of accomplishing this task, my first chapter is devoted to spelling out Polanyi's description of personal knowledge which he has generalized from processes operative within scientific inquiry. The second chapter is devoted to an evaluation[1] of five claims whereby scientific knowing has been fallaciously distinguished from religious knowing. The third chapter represents my creative attempts to describe the processes operative within Christian faith and revelation. This third chapter also offers an ontology of God whereby He can be understood as supremely present without disrupting or supplanting existing human processes, and it ends with an understanding of Jesus' unique revelation as falling within the processes which have been proposed as operative within every fresh discovery of God. My task does not include a justification of Polanyi's philosophy. Nor do I expect to refute current theologies of revelation.

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[1] This evaluation applies Polanyi's philosophy as a corrective for late 19th and 20th century philosophies of science. In practice I have found that without this corrective it is quite impossible for my listeners to be receptive to understanding their religious knowing as embracing the same processes as their scientific knowing (since they have been taught to distort the role played by observation and testing in science).

Being consistent with Polanyi's own awareness that a framework of thought cannot have an objective justification nor be justified by an extraneous framework, I offer this dissertation to the present reader for a satisfying acceptance as a whole. I offer it especially to those who themselves are wrestling with the gap that looms large between processes effective in scientific knowing as opposed to religious knowing. I also recommend it highly to those who are very painfully aware of the personal and parochial dimensions of the various Christian creeds and practices. Finally I offer it to those who are trying to secure a balance between the authoritative answers handed down in their Christian church and the authoritative experience of their lives which conflicts with that tradition.

In the preparation of this dissertation, I wish to especially thank Dr. Bernard Loomer who knew well how to discern and preserve the intellectual passions of my life within the academic demands for creative scholarship. I thank Margaret Singer who aided me through her supportive friendship and Mrs. Edith Davidson, my accomplished typist. Finally, I thank men everywhere who, by accepting their own calling, have freed me to pursue mine.

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Within this perspective, the reality of God is immanent (and available for human discovery) in our world through the boundary control which He exerts within the world-wide creative emergence. As such, the phenomena of revelation cannot be restricted exclusively to any particular event or particular community since God's initiative has a universal character. In addition, the reality of God is transcendent (and concealed against human discovery) with respect to the world insofar as his initiative in the world is open to an indeterminate range of future manifestations. As such, the phenomena of revelation cannot be exhausted in any particular, finite series of past discoveries, and the personhood of God must be sought within an as-yet-undisclosed set of future events 136

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CHAPTER ONE

SETTING OUT POLANYI'S HEURISTIC FRAMEWORK

A PHILOSOPHY FOR BOTH SCIENTIFIC AND CHRISTIAN KNOWING

The Organismic, Sociological, and Epistemological Parameters
of Michael Polanyi's Philosophy of Personal Knowledge
Are Set Out In Order To Illustrate How the Self-same Personal Powers
Enable the Individual to Perceive Scientific/Christian Realities
and to Discover or Have Revealed an Indeterminate Range
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SETTING OUT POLANYI'S HEURISTIC FRAMEWORK:

A PHILOSOPHY FOR BOTH SCIENTIFIC AND CHRISTIAN KNOWING

The preliminary contention of this chapter is that the critical faculties of modern man are rightfully dissatisfied with positivism in science and supernaturalism in Christianity. Both of these formulations are at best elliptical; at worst, misleading. In response to this situation, the body of this chapter sketches the synthetic[1] philosophy of Michael Polanyi.[2] Within his philosophy, science and Christianity are interpreted as two different aspects of man's cultural heritage which depend upon the same organismic, epistemological, and sociological processes which specify all human performances.

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[1] The use of the term synthetic relative to Polanyi's philosophy is herein understood to designate its general applicability to all domains of knowing. As such it distinguishs itself from the narrower twentieth century philosophies such as the philosophy of art, the philosophy of religion, the philosophy of language, etc.

[2] Michaeol Polanyi (born 1891) began his career in medicine; but, shortly thereafter, he mastered physical chemistry wherein he has a long, distinguished record which includes 218 publications. Following World War II, he gave increasing attention to the philosophy and sociology of science as a cultural enterprise. His qualified judgments in this area have been widely published. His most significant writings are Science, Faith, and Society (Hereafter abbreviated to SFS, being The Riddell Memorial Lectures of 1945, citations from the Second Phoenix Impression [Chicago: The University of Chicago Press, 1966]; Personal Knowledge (hereafter abbrevbiated as PK, citations from the Harper Torchbooks Edition of the Gifford Lectures, 1951-1952 [New York: Harper and Row, Publishers, 1964]); The Study of Man (hereafter abbreviated as SM, being the Lindsay Memorial Lectures of 1958, citations from the Fifth Phoenix Impression [Chicago: The University of Chicago Press, 1965]); The Tacit Dimension (hereafter abbreviated as TD, being the Terry Lectures of 1962, citations from the Anchor Books Edition [Garden City: Doubleday and Company, 1967]).

The themes found within Polanyi's works continually repeat themselves; thus, the following footnotes do not intend to be exhaustive but only to serve in guiding the reader in locating core areas of his philosophy.

A more extensive biography of Polanyi is found in the appendix.

I. The Joint Search For Foundations

Since their respective origins, scientists and theologians have been prone to accept elliptical formulations of their separate enterprises because they have always tacitly supplemented these formulations by their personal experience which made their sketchy formulations ring true. Most traditional notions of both the scientific and Christian enterprises are overdue for drastic revisions.

The modern scientific enterprise since its 16th century origins sought to save its rightful independence from Christian philosophers by radically denying that authority or belief had any part in its enterprise. Scientists assured themselves and others that their natural rational powers of induction allowed them to secure their generalizations due to the objective consideration of stubborn irreducible facts. Later generations expanded the inductive method to include verification by experimental testing. The various schools of scientific positivism have all, in one form or another, perpetuated this notion of scientific objectivity based upon experimental facts. The growing criticism[1] of this scientific positivism has come largely from scientists themselves who grew discontented with the self-understanding that their tradition impressed upon them. Notable instances of this self-criticism are to be found in Pierre Duhem's The Aim and Structure of Physical Theory (originally published in 1914); Alfred North Whitehead's Science and the Modern World (1925); Michael Polanyi's Science, Faith, and Society (1946). Duhem convincingly argued that no isolated assumption can ever be either proved or disproved within a contrived experiment. Whitehead showed that the "deeper faith" which informs the "scientific instinct" can never be justified on the basis of any inductive generalization. Finally, Polanyi's keen historical background allowed him to specify that no controverted issue in science is settled solely on the basis of experimental evidence; the inscrutable, passionate judgment of the scientist always remains the final arbitrator as to what he will accept as true.[1]

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[1] The criticism of scientific positivism is only sketched here. The detailed criticism will be reserved for the following chapter of this dissertation.

The Christian enterprise, for its part, has been critically transformed with respect to its own self-understanding due to the progressive laicization of science within Western culture.[2] Up until the eighteenth century most laymen assumed that Christianity was able to secure its foundations based upon the authority of God's revelation. The Sacred Scriptures were divinely authorized, and the supernatural acts of God were popularly experienced. Almost imperceptibly chemical fertilizers seemed to replace the holy water which the priest sprinkled on the field; stubborn conservatives finally consented to allow one of Franklin's lightning rods to protect their church along with their prayers; demonic possession became understood as a psychosomatic disorder. Nearly every popularized conclusion of the new geological, biological, and psychological sciences seemed to register as a step forward which demanded a step backward on the part of traditional Christian beliefs.

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[1] Polanyi, SFS, 21-31; PK, 15-17, 264-68; SM, 62.

[2] Alfred North Whitehead, Science and the Modern World (New York: The New American Library, 1964), p. 45, and Langdon Gilkey, Religion and the Scientific Future (New York: Harper and Row, Publishers, 1970), p. 4ff represent two qualified references here.

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Eventually many ministers and theologians within the Christian churches themselves became aware that their God-inspired Scriptures were culturally rooted in a primitive, Middle-Eastern milieu. Furthermore, personalism and democracy fostered instincts which allowed many Christians to challenge the traditional authoritarian structures and fossilized morality which characterized most Christian institutions as they moved into the twentieth century. All in all, the hitherto acceptable formulations of Christianity in some form of supernaturalism have proved largely unsatisfying (save in Fundamentalist[1] circles wherein religious passions have negated modern critical faculties momentarily).

So far we have alluded to the joint search for foundations: a significant minority of scientists are searching for a viable alternative for the dubious notion of scientific objectivity; a significant minority of theologians are searching for a viable alternative to culturally-inadequate supernatural formulations of Christian belief. Understandably this joint search for foundations will greatly modify the future response to the troublesome relationship between science and Christianity which so aroused the passions of controversy for two and a half centuries. Traditional formulations of the split between the scientific and Christian enterprise have sought to point to some specifiable division within man himself. As a consequence Christianity was sometimes characterized as the science which cares for man's soul while the empirical sciences mastered the care of man's body. Other divisions depended upon still

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[1] Paul Tillich criticizes the various types of fundamentalism as demonic: "It destroys the humble honesty of the search for truth, it splits the conscience of its thoughtful adherents, and it makes them fanatical because they are forced to suppress elements of truth of which they are dimly aware" (Systematic Theology [Digswell Place: James Nisbet and Company, 1964], vol. I, 3).

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other dualisms: mind/heart; reasoning/believing; controlling reason/ receiving reason; objective knowing/subjective knowing; what-man-is/ what-man-ought-to-be; nature/grace. In recent years a significant minority of both scientists and theologians have come to question such divisions and have shown, on the contrary, that beneath their defensive rhetoric, the Christian and scientific enterprises have much in common.[1]

Before spelling out Michael Polanyi's synthetic philosophy which overcomes the once-accepted dualisms mentioned above, the reader is invited to imagine that most elliptical formulations of both science and Christianity merely focused on one small aspect of their enterprise. They may have been quite accurate in what they affirmed but quite mistaken in what they denied. While there have been historical reasons[2] which seduced both sides into taking their respective positions; few if any, of them still exist. This is not to imply that the purposes of science and Christianity coincide. Rather, it is to suggest that a more satisfactory understanding of man is to be attained by combining what both Christianity and science know about human knowing processes and then to recognize the significance of these combined human processes in every domain of man's culture. Historically Christianity has rightly focused upon the necessity of belief (assent based upon authority) and upon the apprenticeship required for adequate participation in a tradition. The empirical sciences have largely ignored the long years of training during which a future scientist must submit his judgment to that of his masters. The description of the sciences has always been enamored with one or more aspects of the process of discovery. Scientists prided themselves upon their long tradition of periodic discoveries which progressively renewed and enlarged their shared competence. Christianity, in contrast, always insisted in its official rhetoric that its function was merely to pass on the saving revelation of Jesus Christ without loss or addition. Contrary to its rhetoric, however, no period of Christian history lacks both theoretical and practical innovations[1] accredited especially to its Fathers and Doctors (some of whom were heretical) as well as its bishops and founders of religious orders (some of whom were not saints). Thus, as an over-simplified preview, it might be noted that Christianity has downplayed its creative advance while science has downplayed the necessity of belief and apprenticeship for entering upon its vision of the world. Expressed positively, Christianity might learn from science that creative developments must be recognized and integrated in fidelity to the past; science might learn from Christianity that its own present service to purposes and visions is only possible because of its reverence for its past heritage of revelatory discoveries.

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[1] Polanyi, "Science and Religion: Separate Dimensions or Common Ground?" Philosophy Today, VII (Spring, 1963), 4-14; Harold K. Schilling, "On Relating Science and Religion," The Christian Scholar, 41 (1958), 423-30; and Charles A. Coulson, "The Similarity of Science and Religion," Science and Religion, ed. by Ian G. Barbour (New York: Harper and Row, Publishers, 1968), p. 64ff represent three excellent sources which specify parallel processes in both the scientific and religious enterprises.

[2] Cf. e.g., Whitehead, op. cit., pp. 161-172 and Gilkey, op. cit., pp. 3-34.

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[1] For a historic overview of how innovations have been continually assimilated or anathematized by the Christian tradition, cf. Yves M.-J. Congar, Tradition and Traditions (New York: The Macmillan Company, 1967); Justo L. González, A History of Christian Thought (2 vols.; Nashville: Abingdon Press, 1970-71); Adolph Harnack, History of Dogma (4 vols. translated from 3rd German edition; New York: Dover Publishing Co., Inc., 1961); John Henry Cardinal Newman, An Essay on the Development of Christian Doctrine (8th edition; London: Longmans, Green, and Co., 1891); Jaroslav Pelikan, Development of Christian Doctrine: Some Historical Prolegomena (New Haven: Yale University Press, 1969); Jaroslav Pelikan, Historical Theology: Continuity and Change in Christian Doctrine (Philadelphia: Westminster Press, 1971); and Robert L. Wilken, The Myth of Christian Beginnings (Garden City: Doubleday and Company, Inc., 1972).

II. Michael Polanyi's Synthetic Philosophy for Human Knowing

The contention of this section is that even though the scientific and Christian enterprises serve different purposes they must nevertheless harness the same organismic, epistemological, and sociological processes which govern all human knowing. In this regard Polanyi introduces the notion of boundary control.[1] He illustrates boundary control by pointing to the human purpose which operates to set boundaries upon the sequence of neural-muscular movements of a skilled athlete. Conversely the operational principles governing an athlete's body impose a boundary upon the range of human purposes which can be attained even though they do not and cannot in themselves specify the human purpose which they will serve. Thus the skillful performance of an athlete functionally interrelates neural-muscular processes and human purpose without confusing or reducing one to the other.

Applying this to the Christian enterprise, our contention then becomes that this enterprise can be governed by divine purpose on the one side but that it must respect the human processes which govern man on the other. Boundary control permits the purpose of the Christian enterprise to be irreducible to human processes at the same time that it meets and harnesses them.

When there is no due recognition of boundary control, the two sets

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[1] Polanyi, "Life's Irreducible Structure," Science, vol. 160 (June, 1968), 1308-1312. In a more sketchy formulation in TD, "marginal control" is used instead of "boundary control." The theological implications of boundary control will be later fully developed in Chapter III, thesis IV.

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of operational principles become confused. Thus, formerly, the efficacy of divine purpose could only be guaranteed by a miraculous alteration of secondary processes. More specifically, man's environment could serve God only if God intermittently stepped in and altered the course of Nature; an inspired writer could serve God's purposes only if God stepped in and took control of his faculties; a Christian life could serve divine purposes only if some of the divine nature was able to dwell within the man. The Christian tradition, however, was always careful to insist that the human processes were never swallowed up by the divine. The long and persistent battles to save the humanity of Jesus without denying his divinity manifests the incarnational principle of union without confusion. For our purposes in this chapter, the interpenetration of the human and the divine will be specified in terms of boundary control.[1]

When applying boundary control to the scientific enterprise, we are forced to acknowledge that this enterprise too must serve some purpose which transcends merely individual human processes. This intimation of superior obligations in science will be returned to later.

Moving now to a description of the human processes which govern all human knowing, the following presentation will be loosely grouped into three sectors: (A) organismic processes, (B) sociological pro-

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[1] The author judges that boundary control does preserve the primary intent of traditional formulations. In the Augustinian-Fransciscan tradition the sensual symbols directed the attention of the knower while a divine illumination was necessary to make visible the eternal truth to which the symbols drew attention. The Thomistic-Scholastic tradition moved its attention from the process of knowing to the substantive faculty which undergirded the process. Here grace was understood to build upon and elevate nature such that God's knowledge and purposes come to bear upon the natural faculties of man without suspending their own proper operating principles.

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cesses, and (C) epistemological-ontological considerations.

(A) Organismic processes

All knowing relies upon the organismic integration of particulars into a self-satisfying whole. Polanyi considers the organismic integrative powers to constitute the tacit powers[1] present in all knowing. He holds that these bodily integrative powers cannot be specified or further reduced to more elementary operating principles.[2] Essentially he relies upon the extensive research of Gestalt psychology in order to specify the process of perception. However, he greatly extends the findings of Gestalt psychology by emphasizing the muscular component[3] in perception and by extending the Gestalt model to all manner of skills up to and including the creative discoveries of genius.[4]

To appreciate how artistic, technical, and athletic skills fall under the same integrative process as perception, it is necessary to recognize the extensive motor skills operative during any sensory perception. Since we rely principally upon visual perception and since vision appears effortless, sight has often been specified as a passive phenomena akin to the operation of a camera. This interpretation would be satisfactory if attention were drawn to the operator of the camera who must be quite active in adjusting the aperture, focusing the lens, and accurately directing the apparatus. The activity of seeing becomes apparent through studies of the initially tedious process whereby an infant or an adult born blind (but recovering his vision through corrective surgery) acquires the skill of seeing.[1] For the untrained eye there appears only an undifferentiated, fuzzy field of colors. For the trained eye, objects of interest are immediately centered upon and brought into focus by sophisticated adjustments in muscular tension. Muscular strains are effortlessly interpreted inside the body in terms of placement and distance from the body. After a few months, an infant is given over to waving its arms frantically at any object which captures its interest even though the object may be situated considerably beyond the reach of the infant. A trained organism relies upon sight for the seemingly-automatic assemblage or adjustment of delicate instruments. In effect, therefore, perceptual skills and motor skills all require initially-tedious integrations of both muscular strains/tensions and neural responses (involving both fresh and remembered components). As every man incessantly assimulates and manipulates his milieu, he progressively extends his tacit powers of discrimination and recognition which are associated with his growing mastery over his own body.

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[1] PK, IX-XI, 1964 preface to the Harper Torchbooks Edition; and TD, IX-XI, 1966 introduction to the Anchor Books Edition for an understanding of the centrality of tacit powers in the knowing process and of the tacit dimension in all formulations of knowledge.

[2] Polanyi, "Life's Irreducible Structure," op. cit., p. 1308ff.

[3] Polanyi here relies upon the studies of Jean Piaget. Cf. index in PK for direct references.

[4] TD, 15, 29ff; SM, 28.

Three aspects[2] of tacit knowing are important here: (1) its functional structure, (2) its phenomenal structure, and (3) its semantic aspect.

(1) The functional structure of tacit knowing specifies that the particulars function as clues for the integrated whole which functions as

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[1] TD, 14; PK, 61.

[2] This division follows TD, 10-14. A fourth aspect (the ontological) is reserved for section II, part 3 of this paper.

the meaning of the particulars. Watch the movements of an accomplished diver as he gets the feel of an unfamiliar board before using it. For him all the particular strains in his body act as clues which are integrated in the "feel" he acquires for the diving board. Or again, each time you pick up a letter addressed to you and immediately recognize who sent it, you are attending to orthographic clues which are integrated in the identification of the sender.

(2) The phenomenal structure of tacit knowing deals with emergence. The moment that the integrated whole (or meaning) emerges from a set of particulars, the whole occupies our focal attention and the clues are retained in only a subsidiary awareness. This becomes clear when we are again asked to focus upon the particulars and the meaning is lost. Thus a diver who became attentive to his particular movements would instantly become unable to complete his total performance. Likewise a clever person could have you doubt whether you were able to identify the sender of a letter if he could get you to try to specify what shapes of what letters made you certain you knew the author. Polanyi captures the phenomenal structure of tacit knowing in a nutshell when he says, "We can know more than we can tell."[1] And to this it can be added that when we try to tell all that we know, we expose ourselves to losing awareness of the very meaning we did have before we got lost in the particulars. An immediate application of this to the scientific and Christian enterprises would suggest that the method for arriving at a particular scientific or religious stance can never be fully specified.[2]

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[1] _TD_, 4.

[2] Here Polanyi opposes those within the Vienna School of Logical Positivism who assume that scientific method and knowledge are, _per se_, open to unambiguous, explicit formulation.

(3) The last aspect of tacit knowing that shall be treated at this time is the semantic aspect. This refers to the displaced meaning, which we experience in the use of language, that can be applied to all knowing. Dwelling upon the words does not stop with the mere meaning of the words but immediately projects it as the intended meaning of the author of the words. So too, the diver feels only his own body (he dwells within its muscular strains and neural responses). The integrated whole which he feels, however, does not remain simply his subjective state; he immediately projects his felt meaning upon the diving board which he is testing.[1] The projected meaning may be mistaken, but the act of projecting that meaning is never mistaken. Neither can the meaning-for-the-knower be indiscriminatingly confused with the meaning-for-the-known. Nevertheless, when man's attention is focused upon an object, his bodily-awareness-of-the-object-felt-within-himself is rightly transferred to the focus of his attention. Polanyi argues his point by examining the process which occurs when a man uses a tool, a probe, or a walking stick.[2] Strictly speaking the jerks and strains while using a walking stick (when blind or blindfolded) are felt in the hand, but the meaning of these particulars is immediately projected as the feel of the pavement over which the opposite end of the walking stick is passing. At this moment the walking stick becomes an extension of the body; the blind man learns to dwell within his walking stick. This

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[1] Here Polanyi avoids opting either for an objective or a subjective mode of knowing which seemed mandatory ever since Descartes mind-body split. Cf. Helmut Kuhn's use of Polanyi in "Personal Knowledge and the Crisis of the Philosophical Tradition," Intellect and Hope, ed. by Thomas A. Langford and William H. Poteat (Durham: Duke University Press, 1968), pp. 111-135.

[2] TD, 16; PK, 61.

same example can be extended to the use of tools, probes, maps, diagrams, language. More importantly, however, it provides the structure whereby one man can be said to dwell within the mind or performance of another, as we shall now see.

Once the role of man's organism is recognized in knowing, it can be said that "indwelling" is the proper mode for all knowing. In ordinary perception, one dwells within the clues offered by one's body in order to achieve an integrated meaning. In using a tool, one dwells within the clues offered by the tool as an extension of one's body. However, what if one wants to know the mind or the performance of another man? Does indwelling properly apply in this case where personal tacit powers are hidden from any direct inspection? Polanyi replies with an emphatic "yes." He insists that one can come to dwell in the mind or performance of another only by "reliving its workings."[1] For example, assume that one wanted to acquire the chess strategy of Bobby Fischer. Does Fischer have a set of rules which he uses to define his strategy? Perhaps he does. Having him tell his rules, however, may be quite deceptive because rules are of little use to the person who does not have Fischer's refined personal judgment so as to know how to interpret his rules.[2] This brings us back again to the necessity of knowing how Fischer applies his rules in order to know what they mean. In order to know Fischer's strategy one must painstakingly re-enact a large number of his chess performances. This is exactly what novices in chess do. After they are told how the pieces may move and played a few games themselves so that they get some feel for the interdependence of the pieces; then, they can readily learn the decisive element of strategy by contemplating the performance of those players who are superior to them. In each instance one is forced to dwell within the clues of a particular performance just as one dwells within one's own personal performance. In this learning situation, there is always a heuristic gap between the clues offered by the master and the tacit powers of the novice who hopes to capture faithfully the meaning which the master intended in his performance. This presentation of learning makes it akin to an active pursuit of discovery whereby the minds of genius may be made one's own. Having arrived at this point, the sociological processes of human knowing now suggest themselves.

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[1] TD, 16ff with footnotes wherein Polanyi aligns himself with W. Dilthey and F. Lipps.

[2] PK, 49ff.

(B) Sociological processes.

Man's entire advantage over the various socialized animals can be specified in terms of his facility in accumulating and transmitting a rich cultural heritage.[1] Chimpanzees develop an impressive set of bodily gestures (grimaces and grunts) which suffice to communicate their present feeling states. Man has the organismic skill to differentiate, interpret, and manipulate tens of thousands of bodily gestures which he communicates principally as audible sounds (divided into sentences, words, phonemes). During the first eighteen months the human infant develops skills notably slower than its chimpanzee counterpart.[2] After the eighteenth month, with the onset of language skills, the human child soon outstrips pitifully the chimpanzee. How is this so?

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[1] PK, 69ff. While man's superiority over the animals is here specified in functional terms, Polanyi does not overlook the "tacit intellectual powers" which are the ground for such superiority. Neither does Polanyi allow that alertness, inquisitiveness, and problem solving in animals (as well as human infants) are discontinuous with the intellectual powers of mature adults. This will be taken up again in Chapter III.

[2] Ibid.

From the previous section we remember that the tacit powers of perception were traced from the rudimentary acts of sense perception all the way to the highly sophisticated knowing of the strategy of a genius. In every case dwelling within the particulars emerged as the assimilation of the meaning of the whole. Thus with the onset of the child's response to language stimulation, the child is on its way to the stage-by-stage assimilation of the performance-skills of his parents. Their performance-skills in turn reflect the cultural heritage shared by a sizeable interdependent and mutually stimulating sector of humanity. Cultural stimulation and formation are so dominant in man that his self-moving and self-satisfying organismic instincts rely little upon isolated experiential learning and are almost exclusively molded by his cultural heritage such that it is commonly said he has acquired a second nature.

This is indeed the case. Before the child's powers of self-exertion are even awakened, he has already assimilated a vast part of the perceptual-motor skills shared by the members of his culture. Specific modes of satisfaction are already ingrained within his nervous system which facilitate certain dominant patterns of acting for the rest of his life. At an early age most young people embark upon a further self-chosen professional apprenticeship. The scientist or the theologian, the technician or the minister, for example, emerges from a long process wherein, by submitting his judgment and experience to his masters, he becomes gifted with a participation in their own powers of judgment and experiencing. Quite noteworthy is the expressed expectation that, following the long conditioning process of an apprenticeship, the trainee is expected not only to represent his cultural tradition but even to assert his independence in that tradition.

Polanyi applies this as follows to the scientific community:

> To learn an art by the example of its practice is to accept an artistic tradition and to become a representative of it. Novices to the scientific profession are trained to share the ground their masters stand and to claim this ground for establishing their independence on it. The imitation of their masters teaches them to insist on their own originality, which may oppose part of the current teachings of science. It is inherent in the nature of scientific authority that in transmitting itself to a new generation it should invite opposition to itself and assimilate this opposition in a reinterpretation of the scientific tradition.
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> The authority of science resides in scientific opinion. Science exists as a body of wide-ranging authoritative knowledge only so long as the consensus of scientists continues. It lives and grows only so long as this consensus can resolve the perpetual tension between discipline and originality. Every succeeding generation is sovereign in reinterpeting the tradition of science. With it rests the fatal responsibility of the self-renewal of scientific convictions and methods. To speak of science and its continued progress is to profess faith in its fundamental principles and in the integrity of scientists in applying and amending these principles.[1]

Admittedly this is the sociological process of renewal operating in the scientific community at its best. In practice, however, free inquiry, open discussion, and impartial evaluation are always amalgamated with baser motives. Isaac Newton's hard-won successes followed by his long years of authoritarian suppression of dissenting voices in the Royal Academy of Science is well-documented.[2] At the time of his death he had assured himself that every scientific post in England was filled by one of his hand-picked men. In the Soviet Union,Vavilov's persecution at the hands of T. D. Lysenko in the name of scientific orthodoxy is also known.[1] Polanyi refuses to believe that such cases indicate that truth is relative. Quite to the contrary, he holds that truth is personal but that the personal truth which each man is bound to hold is rooted in a shared tradition and an intimation of reality which no man is free to deny.[2] This will be spelled out further in the following chapter.

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[1] SFS, 8.

[2] Frank E. Manuel, A Portrait of Isaac Newton (Cambridge: Harvard University Press, 1970), p. 119ff.

The sociological processes involving parental apprenticeship, personal independence, and renovating dissent have equal application in the Christian community. Polanyi specifies the Christian inquiry to be worship which offers suitable clues for the correct perception of God.[3] Moreover, an incarnational theology suggests that the Christian worships God rightly only by taking on the mind of Jesus Christ. The Christian apprenticeship, therefore, consists in the prayerful meditation of the primitive accounts of Jesus' performance along with the careful re-enactment of the Lord's Supper. By so doing the Christian comes to dwell in Jesus and to assimilate his Spirit. The gestures of Christian worship and the formulations of Christian belief often fail to bring the Christian to the position where his organismic skills are such that he could assert his independence upon the same grounds as those who faithfully transmitted the Good News to him. On the other hand the constant reoccurrence of healers, prophets, saints, and teachers in the Christian churches attest to its past vitality. Furthermore, Christians of every epoch have never been content merely with the banal repetition of the performance of their Lord; they all felt the lure to express within the fabric of their own lives an original service to the divine purposes and ideals which they assimilated from Jesus Christ. Whether in the relief of the indigent or in the arming of crusaders; Christians have always found original expressions which they vindicated as God's purposes since they felt themselves impelled by the same Spirit which impelled Jesus to assert his own independence within his Jewish tradition. Obviously the Christian communities must establish effective processes to discriminate religious quackery from religious genius.[1] One function of authority within the community has always been the discernment of spirits. Our intention here cannot include a treatment of how effective and serviceable various historical practices of authority have been within the churches. In any case, the Gospel remembrances have always served as a permanent criterion (recognizing its remoteness to us) for the authentic discipleship accredited by the churches. So did the reflections of the Fathers and Doctors and the lives of the prophets and Saints. In sum, the accurate discernment of the face of Christ today and the existential portrayal of Christian belief implies the passing down of tacit skills which guide the personal judgment of authority in discerning true from false manifestations of the Christ. Polanyi assures us that the authoritarian and dogmatic trappings commonly associated with the Christian exercise of internal control must not be confounded with their function in the authentic transmission and enrichment of the personal powers of Jesus:

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[1] _SFS_, 8.

[2] _Ibid_., 82.

[3] _PK_, 281.

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[1] The various charismatic gifts (including prophesy) were readily accepted in the primitive Christian communities; efforts were directed toward distinguishing authentic gifts and regulating their exercise. Cf. especially I Corinthians 14 and the Didache.

> Though religious beliefs are often formulated more dogmatically than other beliefs, this is not essential. The extensive dogmatic framework of Christianity arose from ingenious efforts, sustained through many centuries, to axiomatize the faith already practiced by Christians. In view of the high imaginative and emotional powers by which Christian beliefs control the whole person and relate him to the universe, the specification of these beliefs is much more colourful than are the axioms of arithmetic or the premises of natural science. But they belong to the same class of statements, performing kindred fiduciary functions.[1]

(C) Epistemological-ontological considerations

Up to this point two indeterminacies have been suggested which have an intimate bearing upon considerations of how man can claim to know what he knows. The two indeterminacies are as follows: (1) the organismic power of integrating particulars into meaningful wholes cannot be specified in terms of more elementary powers, and (2) the clues which enter into any particular integration are never fully specifiable since they must be held in subsidiary awareness at the moment that their joint meaning occupies the focal awareness. Thus the two indeterminacies boil down to an irreducible tacit process and an unspecifiable tacit dimension which undergirds all knowing. These two indeterminacies make it impossible to secure any segment of our culture from some position outside the very organism of the knower himself. In other words, all knowing is personal: any program of critical doubting should end up by doubting the organismic integrating process itself, and any program seeking some objective validating criteria should end up with rules that no one can apply without the appropriate training.

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[1] PK, 286.

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The only way out of this dilemma is to accredit the body's processes of integration as such.

The accreditation of a process does not mean the indiscriminate accreditation of its products as universally acceptable. Primitive incantantations and rites which claim oracular powers are found by Europeans to be manifestly absurd and incapable of engaging their personal commitment. What we can learn from this is that what we accept as true is largely attributible to the long apprenticeships which have fashioned particular self-satisfying performances as the normative second nature which guides the responses of our tacit powers. Outside of an immersion in our cultural heritage, we are condemned to an isolated existence little better than that of the higher animals; within our cultural immersion, we are predisposed to perceive and manipulate the world according to an assimilated set of standards which can only partially be specified.[1] This partial specification, we may recall, is due to the recognition that we know more than we can tell. Every apprenticeship which offers its classical instances as the normative instances for the acquisition of correct perceptions and modes of feeling knows that it is only offering clues which the apprentice himself must actively integrate as his own. With regard to a general cultural initiation and the various higher apprenticeships in art, science, religion; these skills can be accredited only by participation in their performance. Today this is painfully evident in the way most psychologists prefer to simply overlook or even to look down upon parapsychological phenomena. Parapsychologists have found it necessary to found their own clinics and publish their own journals in order to properly pursue their own commitments. In similar fashion most American Christians, especially those over thirty, find themselves turned off by the so-called Pentecostals. The outcasts, on the other hand, define their Christianity in terms of their baptism by the Holy Spirit.[1]

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[1] PK, 252, 264-68, 299.

The decisive formative factor of an apprenticeship is now seen as the necessary process for the assimilation of the appropriate set of tacit skills which will allow the adherent to share common presuppositions expressed in a shared idiom. Yet the adherent, in his dedication, serves shared purposes through his acquired skilled performance with its associated satisfactions. In this perspective, the acceptance of an apprenticeship already implies the accreditation of common purposes along with the confidence that the skills possessed by one's masters are adequate to those purposes. From the viewpoint of the apprentice, he intends to acquire the knowledge which he believes his masters possess and therefore accredits what they know on the basis of their authority. Later he acquires the skill to share their minds and therefore accredits their shared knowledge. From this it now becomes clear that belief in authority is the indispensible basis for the beginning of all knowing.[2] It is further clear that each man is called to work

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[1] Pentecostal Christians secure their belief on the basis of their personal experience of the Holy Spirit. Outsiders recognize that they are unable to participate fully within a Pentecostal community without themselves having received the baptism of the Holy Spirit. As a consequence apprentices to Pentecostalism are guided and encouraged by their masters to acquire the tacit skills necessary for this baptism as soon as possible upon entering.

[2] Polanyi follows Augustine here: "All those things to begin with we simply believed, following authority only, we came to understand..." (Of True Religion, section 14). This shall be returned to in later chapters.

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out his salvation within the particular heuristic circle which he intends as his own.[1]

Now if every man affirms what he knows because his apprenticeship has equipped him with modes of satisfaction which pre-dispose him to judge as true the particular formulations and performances which are commonly accredited by the tradition he represents, then we would expect the banal repetition of a tradition until kingdom come. Yet this is decidedly not the case. Innovators appear. These men overcome their conditioning, passionately embrace novel performances, and insist that their very apprenticeship has brought them to accept a truth which must now enrich their own tradition. The innovator continues to respect his peers; he appeals to them on the basis of how-things-ought-to-be as opposed to how-things-are. Yet the settled instincts of most of his colleagues are first and foremost conservative--even passionately so. There is no other way. Between the *status quo* and every innovation there looms a heuristic gap. Perceptions molded according to one mode of satisfaction block perception according to another mode. Gestalt psychologists often illustrate this by showing a viewer a drawing of blocks set together in a pattern. The viewer can perceive either five or seven blocks depending upon his initial perspective. A viewer who integrates the clues so that five blocks appear finds that it takes enormous effort to undo his first spontaneous integration in order to search for the seven blocks which he believes the psychologist has also been able to discover among the clues. This illustrates very well the process of discovery which can now be considered in more detail.

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[1] *PK*, 288ff and 299.

Just as every apprentice comes to know only by believing that the clues his masters offer him have coherent meaning; the innovating master must himself begin his inquiry only on the force of his belief that some novel reality lies hidden among his clues which has eluded even the best minds in his profession up until then. The belief of an apprentice is based on the authoritative performance of his masters who know that the clues make sense. The belief of the innovator has no authority to guarantee him that he is on the right track. Yet, the innovator believes that the reality which he is investigating exists independent of himself and that the real characterizes itself by its indeterminate range of future manifestations.[1] He relies upon his tacit skills to sense the presence of that hidden reality even in its novel manifestations. In his imagination he has already glimpsed the nature and form of some novel manifestation. Now his research skills are called upon. He feels the gap between the way his organism presently perceives reality and the way he imaginatively believes ought to be possible. Now his performance skills and intuition are called upon to try to bridge the heuristic gap. Anticipation of his result gives him a passionate persistence. This same anticipation guides his judgment as he, like a man in a dream, selects his clues and gropes among them for the self-satisfying solution which he senses without being able to give any strict account. He gropes along like a man in a maze who retraces his steps out of blind corridors and who marks progress through some correct hunches. Finally, in a burst of passionate satisfaction he fully integrates just those clues in just the right way that he now sees the reality which had lured him on. Then he skillfully sets out to enrich the world by publishing and taking responsibility for his discovery. He holds the reality which he has now perceived for the first time to be there for all to see. He skillfully sets down the plan which brought him to discovery and which he believes will enable his colleagues to discover what he has seen also. He holds what he now perceives as true with universal intent.[1] He may not convince all his colleagues; he may be discredited by someone who will discover a fatal flaw in his work. Nevertheless, at the beginning, he holds that, what he has seen, all will soon discover just as he found it to be. Moreover, he hopes that others will extend his discovery to other as-yet-unanticipated sectors of inquiry.

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[1] In Polanyi's understanding, the reality discovered at the terminus of an inquiry is distinguished from an illusion by its "indefinite range of unexpected manifestations." (TD, 24) Cf. also SFS, 10; PK, 5, 104, 116-17, 130; TD, 70-71.

> We must conclude that the paradigmatic case of scientific knowledge, in which all the faculties that are necessary for finding and holding scientific knowledge are fully developed, is the knowledge of an approaching discovery.
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> To hold such knowledge is an act deeply committed to the conviction that there is something there to be discovered. It is personal, in the sense of involving the

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[1] The universal intent with which an investigator puts forward his discoveries is well illustrated by Robert A. Millikan's Nobel Prize lecture of May 23, 1924:

> If a man had seen a football which someone told him was the electron he would be far less certain that what he had seen corresponded to reality, than is the man who has become familiar with the foregoing experiment. By its aid he can count the number of electrons in a given small electrical charge with exactly as much certainty as he can attain in counting his fingers and toes . . . .
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> But the electron itself, which man has measured . . ., is neither an uncertainty nor an hypothesis. It is a new experimental fact that this generation in which we live has for the first time seen, but which anyone who wills may henceforth see (Nobel Foundation, Physics: Nobel Lectures, vol. II [New York: Elsevier Publishing Company, 1964], p. 59).

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> personality of him who holds it, and also in the sense of being, as a rule, solitary; but there is no trace of self-indulgence. The discoverer is filled with a compelling sense of responsibility for the pursuit of a hidden truth, which demands his services for revealing it. His act of knowing exercises a personal judgment in relating evidence to an external reality, an aspect of which he is seeking to apprehend.[1]

The compelling sense of responsibility which the innovative scientist experiences in his pursuit of discovery, Polanyi extends to the artist straining to express some aspect of an artistic reality[2] which inspiration has disclosed. Finally Polanyi applies the paradigm of discovery to the religious worshipper who is drawn by the appropriate clues offered by Christian ritual to discover God.[3] As a consequence the same epistemological and ontological considerations apply to all domains of human knowing. The truth is that which emerges when a person dwells within the clues which his organism has embraced and satisfactorily integrated into meaningful wholes. Rocks and electrons and gods are recognized, therefore, as realities because they manifest their presence to the discoverer both as they are now and as they will be in an indeterminate range of coherent manifestations in the future. Reality hinges upon inexhaustible manifesting; truth depends upon the character of our skills to integrate the clues offered by reality. When knowing skills are shared, the same truth will be perceived by all. When knowing skills are extended, new truths will appear which will disclose further dimensions of reality. Every novel discovery can be transmitted only by pointing to the appropriate clues which will allow others to extend and modify their skills so as to share the novel integration by the discoverer. All learning takes place in precisely the same fashion; the apprentice must stretch his integrative powers through the reenacting of ever more sophisticated patterns of discovery until he himself approaches the very cutting edge of his discipline where various new truths are endeavoring to enter the consensus which will establish the orthodoxy of tomorrow. Finally, in Polanyi's understanding, the pursuit of truth is commitment to a process of appropriating and extending man's skills of personal integration. In effect, therefore, the call of man is to trust a process which is irreducible and to accredit a tacit dimension which can never fully be specified. To these two indeterminacies, a third can now be added: the indeterminate future manifestations of reality into which man's present skills are inexorably drawing him. How else are we to explain the simultaneous discovery by men who are isolated in their research? How else could the "absurd" speculations of Copernicus overthrow in some germinal minds (like Kepler and Galileo) the entire instinct of natural place which pervaded the then-existent culture? How else are we to understand how Jesus found disciples in his milieu who were ready to forfeit the legal certainties of Pharisaical Judaism in exchange for the perilous trust that this is the time of forgiveness in view of the apocalyptic transformations which were soon to come? In each case of discovery, the clues have generally been acknowledged for a long time before genius enables all who have eyes to see and ears to hear to make the self-same integration of the clues themselves. Consequently, the initial discoverer has only to artfully select his clues and his revelation of reality can be shared by others who have been apprenticed to share the same mind which drove the discoverer to pose for himself just the right question and to pursue his solution under the direction of the intuitive bent which most of his peers share with him. In this perspective a prophet may not be accepted in his own community; but, most assuredly, he could not and would not be either acceptable or intelligible outside of his community.

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[1] TD, 24-25.

[2] PK, 133.

[3] Cf. PK, 281ff, wherein the Christian pursuit of God is characterized as a passionate heuristic vision sustained by religious worship.

Innovations always disrupt the *status quo* and are destined either to enrich or impoverish future belief. Thus the establishment does rightly insist that all prophetic innovations be tested. Rules for the discernment of spirits are of little value here without the correct instincts rooted in an effective apprenticeship. In any case, every discoverer feels himself bound to serve the reality which has been revealed to him, even at the risk of being discredited by his community or of being tortured and killed. On the other hand, opponents to the prophetic innovations sense that they are suppressing premature, irresponsible, and unfaithful intuitions which are calculated to undermine their own reading of reality. Conflict is inevitable. The prophet who cannot open the eyes and ears of his community to share the-reality-made-manifest-to-him must ultimately be discredited as a false prophet. The true prophet manifests the reality to which he is the witness thereby converting the persistent opposition of the *status quo*. The struggles of Galileo to universalize the acceptance of the Copernican theory and the struggles of Jesus and his apostles to universalize their religious self-understanding represent classic examples of the above.

III. Conclusions

After our foregoing discussion we can now gather together the

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central contentions which follow from the above:

(1) Past generations have been content to find the foundations of science in some manner of objectivism and to find the foundations of Christianity in some form of supernaturalism. Such formulations are deceptive in so far as they ignore the personal dimension which undergirds all human knowing. In this new perspective, both science and Christianity are appreciated as proper modes of perceiving founded upon appropriate tacit skills of integration. The following chapter will go on to critically examine five objectivist claims whereby scientific knowing has been fallaciously distinguished from religious knowing.

(2) Organismically, both science and Christianity cultivate tacit skills of perception. Sociologically, both science and Christianity rely upon man's ability to assimilate, to enhance, and transmit such tacit skills. Epistemologically, both depend upon appropriate organismic skills for the correct meaning-giving integration of clues such that the appropriate realities appear at the focus of our attention. In drawing this parallelism it is understood that the tacit skills of the Christian faith are directed toward the Christian realities just as the tacit skills of the scientific "faith" are directed toward the scientific realities. Because of this the man who perceives the Christian God correctly may not be able to perceive electrons correctly. The converse also holds true. This can be accounted for by noting the sociological independence of the scientific and Christian communities: an apprenticeship in one does not imply an apprenticeship in the other. This is not true for our general cultural apprentice-

ship which includes elements of laicized science and laicized Christianity which are held by all participants in our culture.

(3) Boundary control allows divine purposes to harvest the fruits of human processes. The Christian, in virtue of the tacit skills which have been passed down from master to disciple in an unbroken chain stemming from Jesus (as the revelation of the Father), claims for himself the correct perception of the Creator and his purposes (i.e. the Christian realities). Thus, the Christian, through his commitment to the self-same purposes which animated Jesus, experiences himself as fulfilling divine obligations. The task of specifying how Jesus and his disciples do indeed rely upon their personal knowing processes so as to reliably discover the Creator and his purposes will be taken up in Chapter III.

Science must likewise recognize superior obligations which harvest the fruits of human processes. From below the long scientific tradition can be seen as enlarging man's skills in perceiving and controlling his milieu. From above this same tradition can be seen as serving the realities which stand over and against man sharing an existence independent of him. Thus the over-arching purpose of the scientific community is related to the emergent recognition of independent realities.

Normally scientific realities are felt as subordinate to man's own initiatives and purposes. The scientist is personally involved, even passionately so, but he only feels that the realities which he explores call to him in such a way that his procedures and formulations respect the independent qualities which the reality manifests. However, the person who is a scientist is sometimes called to a personal confrontation by the reality he perceives in a situation where what-he-is-investigating is felt as calling him to acknowledge its inherent superiority. Here the investigator is no longer himself making demands on the reality before him; but, rather, that the reality is making demands upon him. At such an encounter, science merges into religion. If an investigator were to reverently submit his whole life to the demands of the reality made manifest to him, a full-fledged personal religion would be effected.

(4) Since both science and Christianity are modes of perceiving they can be accredited only by participating in their performance. All formulations which act as rules of performance or rules of belief must be recognized as elliptical due to three indeterminacies: neither the organismic process of integration, nor the exact clues entering the integration, nor the inexhaustible future manifestations of the focal reality can be fully specified. As a consequence the knower must again take full responsibility for what he upholds as true. He executes this responsibility by freely choosing a tradition and laboriously apprenticing himself to develop his knowing powers within that tradition. The reality which he thereby comes to respect and enjoy stimulates him to be ever receptive to new manifestations of that reality. But going beyond this, we have shown that at the cutting edge of a tradition, geniuses are enabled to enlarge the skills of their profession to include original manifestations of that reality to which their traditions is attentive. The product of such genius is generally referred to as a "breakthrough" or "discovery" within the scientific tradition and as a "revelation" or "inspiration" within the Christian tradition. As a consequence of this recognition, the history of science is oftentimes rightly presented as a recounting of the critical discoveries which mark the progress of scientific understanding. The history of religion

as exemplified in the historical books of the Old Testament and Luke-Acts in the New Testament are, in parallel fashion, almost solely concerned with the reception of revelations and their consequences.

In retrospect, this chapter was introduced by a discussion of the current quest to secure the foundations of Western science and Christianity. The foregoing presentation of Michael Polanyi's synthetic philosophy roots these great sectors of our culture within acquired tacit powers. Should these skills be abandoned or neglected for even a single generation, they would be largely unrecoverable by the succeeding generations. (Here again we call to mind our repeated insistence that the records of the past are unintelligible without adequate tacit powers for correctly integrating the clues they offer.) In this perspective, science and Christianity join the other dimensions of our cultural heritage: government, art, technology, custom. Perhaps this precarious position of personal knowing will seem inadequate to account for the sense of assurance and the universal intent which every practicing Christian and scientist senses in his daily commitments. Yet, even though the respective realities of each community do promise an indeterminate series of future manifestations; nevertheless, man's powers to correctly perceive these realities rests on the commitments of many generations which are embraced today in its living masters. Thus knowledge is a gift of the gods which man carries in a frail vessel. Only continued dedication can preserve and enlarge these truths for up-coming generations. Neglected or unworthy commitments forever threaten to plunge man again into darkness. Polanyi's program invites us to again take personal responsibility for the truths we believe and to passionately commit our lives to fulfill those obligations we hold toward those realities that we perceive.

CHAPTER TWO:

THE DISTORTION OF SCIENTIFIC OBJECTIVISM AND ITS REMEDY

Michael Polanyi's Criticism of Five Claims Whereby Scientific Knowing Has Been Fallaciously Distinguished From Religious Knowing

THE DISTORTION OF SCIENTIFIC OBJECTIVISM AND ITS REMEDY

During the struggles of the seventeenth and eighteenth centuries, the new sciences sought to legitimize their inquiries free of the meddlesome interference of a dogmatic philosophy and theology. Out of these struggles a veritable chasm has resulted between scientific and religious knowing. Once the scientific mentality attracted and converted the popular imagination[1] the veritable mysticism of discovery[2] rapidly became the ascendant source for reliable knowledge in Western civilization. By contrast with the authoritarian, no-questions-asked attitude of defensive religious establishments, the scientific method seemingly offered a no-holds-barred approach to inquiry which promised to secure a lasting consensus based upon irreducible facts and indisputable experimental testing. The mysticism of discovery claimed to democratically convince opponents while the mysticism of revelation made appeal to authoritative texts and decisions originating in a pre-scientific era. Thus the scientific enterprise nurtured an anti-authoritarianism along with a passion for impersonal objectivity. In the face of this platform, religious orthodoxy fashioned a stubborn fundamentalism which would embarrass both Augustine and Thomas Aquinas.[1] Christian liberals and modernists, however, took up a self-defeating, capitulating attitude which sought to reconstitute Christianity within the human domains disregarded by scientists (i.e. within feelings, values, morals, rituals, etc.). The neo-orthodox backlash of the 20's sought to face up to science and to confidently assert that Christianity also is based upon its own irreducible facts of revelation and its own indisputable experiential testing of truth.

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[1] A. N. Whitehead has it that the "quiet growth of science has practically recoloured our mentality . . .. It has altered the metaphysical presuppositions and the imaginative contents of our minds . . ." (Science and the Modern World [New York: The New American Library, 1964], p. 10).

[2] Pierre Teilhard de Chardin has it that "in the great body, already coming to birth, of a humanity grouped by the act of discovery, a soul was at last released: a mysticism of discovery (Human Energy [New York: Harcourt, Brace, Javanovich, Inc., 1969], p. 171).

The contention of this chapter is that neo-orthodoxy can only provide a stop-gap measure which mimics scientific objectivism. Basing ourselves upon the critique of Michael Polanyi, our intention is to

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[1] Augustine's De Doctrina Christiana effectively rebukes those who, already in Augustine's era, insisted that the Spirit instructs them as to the meaning of the Scriptures such that they have no need of a qualified, mortal teacher. Thomas Aquinas, himself, borrows from Augustine and admonishes his readers that "since Holy Scriptures can be explained in a multiplicity of senses, one should adhere to a particular explanation only in such a measure as to be ready to abandon it if it be proved with certainty to be false, lest Holy Scripture be exposed to the ridicule of unbelievers, and obstacles be placed to their believing (Summa Theologica, I, q. 68, a. 1). For a competent analysis of the growth of Roman fundamentalism arising in the beginning of the seventeenth century, cf. William A. Wallace, O. P., "Thomism and Modern Science," The Thomist, XXXII, 1 (January, 1968), 67-84. For a competent analysis of Protestant fundamentalism arising out of the debates with Roman Catholics, cf. John Dillenberger, Protestant Thought and Natural Science (Garden City: Doubleday and Co., Inc., 1960), pp. 58, 64, 96.

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illustrate how the scientific claims for objectivity which most scientists and theologians acknowledge are blantantly misleading and threatens the very future of Western civilization.[1] Michael Polanyi aligns himself with a small minority of scientific philosophers[2] who have resolutely sought to reinterpret the scientific enterprise so that it recognizes how passionate, intuitive, and imaginative powers enter into its knowing processes in just the same way as in religion, art, politics, etc. By so doing Polanyi wishes eventually to demonstrate that the critical passion for objectivity must again acknowledge tacit skills formed and transmitted within a fallible tradition as the sole basis for all human knowing. In this perspective scientific and religious knowing are understood as harnessing the self-same organismic, epistemological, and sociological processes. Questions of inquiry and accreditation follow parallel processes. Finally, the critical distinction between the scientific and religious enterprises rests in the uniquely given values and concerns which separate traditions operating within their own self-imposed standards of excellence impose upon their participants.

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[1] PK, 139-42, 144, 256, 396; cf. especially his "Science and Man," Proceedings of the Royal Society of Medicine, 63 (September, 1970), pp. 969-76.

[2] Polanyi himself indicates strong affinities with the following: W. I. Beveridge, J. Bronowski, N. R. Hanson, T. Kuhn, Charles Perelman, Jean Piaget, A. D. Ritchie, Stephen Toulmin, and A. I. Wittenberg (cf. SFS, 12-13). To this list might be added James Conant, Pierre Duhem, Arthur Koestler, Abraham Maslow, T. Roszak, A. N. Whitehead.

The burden of this chapter is to pave the way for a Christian theology of divine revelation which calls upon the same human processes as does a scientific methodology of scientific discovery. By way of paving the way, our intention is to examine critically from Polanyi's perspective five claims whereby scientific knowing has been fallaciously distinguished from religious knowing. These claims are:

I. The Receptive and Non-authoritarian Scientific Attitude
II. The Impersonal and Impassionate Scientific Judgment
III. The Irreducible and Presuppositionless Scientific Facts
IV. The Indisputable and Reproducible Experimental Testing
V. The Pragmatic Accreditation of Scientific Assertions

I. The Receptive and Non-authoritative Scientific Attitude

Many practicing scientists and philosophers of science have contrasted the closed and authoritarian attitudes of dogmatic Christianity with the receptive and non-authoritarian attitudes of scientific inquiry. Julian Huxley, for example, describes institutional religion as a "standpatism supported by authority," while science "consists in the refusal to accept authority as such."[1] Earlier John Dewey endeavored to show that Christianity had aligned itself with the Greek insistence that truth be fixed and unchanging, and he endeavored to specify science as a method of inquiry for changing and improving beliefs.[2] It cannot be doubted that these descriptions and others of a similar nature do have some currency. However, only a blissful ignorance of the history of science would allow one to believe that scientists themselves have been entirely receptive to novelties and non-authoritarian in proposing for others the acceptance of their own positions. Indeed, since most histories of science recount only the success stories,[1] oftentimes it is not evident that the cutting edge of science has always been froth with bitter controversy between the leading scientists themselves.

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[1] Julian Huxley, Religion Without Revelation (London: Max Parrish and Co., Ltd., 1957), pp. 94, 115-16, 119, 122, 177.

[2] John Dewey, The Quest for Certainty (New York: Capricorn Books, 1960), pp. 26-73; and A Common Faith (New Haven: Yale University Press, 1934), pp. 38-39.

Scientists do resist other scientists. Take for example the acknowledgedluminary of science, Sir Isaac Newton (d. 1727). What can one say of the heated, public accusations of plagiarism which he leveled against Leibnitz? What can one say of his persistent attempts to systematically and ruthlessly discredit Hooke so as to attain his post as president of the Royal Society? What can one say of Newton's relentless campaign to consolidate every scientific enterprise within England under the direction of the Royal Society and to fill every academic position with a disciple or admirerer?[2] What can one say of the next three generations of scientists who dogmatically pitted the writings of Newton against all newcomers? Consider for example the following account:

> The revival of the wave theory of light, begun by Thomas Young (1773-1829), is one of the most important features of the history of the nineteenth century. Young pointed out that the dividing of a beam of light into a refracted ray

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[1] Bernard Barber concludes his study of the general and specialized histories of science by noting that he can find only a few passing references to the resistance on the part of some scientists to the novel discoveries of other scientists. Cf. his "Resistance by Scientists to Scientific Discovery," Science, 134 (September, 1961), 596.

[2] Frank E. Manuel, A Portrait of Isaac Newton (Cambridge: Harvard University Press, 1968), pp. 330, 149-59, 272, 265; also I. B. Cohen, "Newton in the Light of Recent Scholarship," Isis, 51 (December, 1960), 489-514.

> at the interface between two mediums was to be expected from the wave theory but had not been satisfactorily explained on the corpuscular theory [which Newton formulated a hundred years before in opposition to the wave theory of Huygens and Hooke] . . . .
>
> But the dogmatic spirit in regard to scientific matters was not yet dead. Young's paper aroused a storm of protest, even of derision and abuse. He was attacked not by the church, as was Galileo, but by some of the scientific, or, more probably, pseudoscientific, contemporaries. His chief assailant was Henry Brougham, afterward Lord Chancellor of England, who 'reviewed' Young's papers in the Edinburgh Review. The nature of Brougham's attack is indicated by the following quotation:
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> > We wish to raise our feeble voice against innovations that can have no other effect than to check the progress of science and renew all those wild phantoms of the imagination which Bacon and Newton put to flight from her temple. We wish to recall philosophers [i.e. natural philosophers or scientists] to the strict and severe methods of investigation . . . .
>
> Although Young replied at length in a privately published pamplet, it was a long time before public opinion was willing to receive his theories with an open mind.[1]

When one enters the twentieth century, the abuse of scientific authority is less evident. What remains, however, is the stubborn resistance which exists between groups of scientists who are in opposition. Consider, for example, the "torrid scientific debate" over the nature of the so-called polymerized water which Boris Derygin produced in 1962.[2] Or again, consider the stubborn resistance of the Nobel Prize-winning chemist, Linus Pauling, who insists in his runaway best seller, Vitamin C and the Common Cold, that 3000 milligrams of vitamin C taken daily effectively cures and prevents the common cold.[1] Polanyi, himself, makes reference to the stubborn refusal of most psychologists to consider the evidence for E. S. P. and to the systematic persecution at the hands of T. D. Lysenko of those Soviet scientists who held the so-called "corrupt, capitalist theory of biology."[2] This list could be extended.[3] It suffices to show that an attitude of receptiveness does have limits; every scientist brings to every novelty prior commitments which must to some degree enter into his current personal judgments. In practice, an unlimited receptivity would so eat up the time of a scientist that he would not adequately attend to his own personal research. As a consequence, a practicing scientist must repeatedly ignore most scientific innovations and rely upon his colleagues for investigating that which escapes his competence and interest.

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[1] F. K. Richtmyer, E. H. Kennard, and T. Lauritsen, Introduction to Modern Physics (5th ed., New York: McGraw-Hill Book Co., Inc., 1955), pp. 33-34.

[2] Cf. summary in Time (October 12, 1970), p. 46.

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[1] Dr. Linus Pauling's claims have been contested. One such investigator, Dr. Sheldon Margen, a physician and chairman of the Nutritional Sciences Department of the University of California, Berkeley, has sought to show that Pauling's experimental data is of doubtful validity. In a symposium held at the medical center of the University of California Dr. Margen showed that Dr. Pauling's experimental studies indicated (a) only a marginal difference in the number of colds reported by the test group as compared with the control group and (b) that sometimes the complications experienced by the vitamin C test group significantly exceeded those experienced by the control group. Furthermore, Dr. Margen cited other studies which indicated that individuals which were told that they were being administered vitamin C (while in fact half of them were receiving a placebo) did report shorter and less intense colds whether they did or did not actually receive vitamin C. The symposium's chairman expressed regret that Dr. Pauling was not present to defend his claims. Cf. summary article by Richard Colman, "Nutritional Scientist Disputes Pauling on Vitamin C," The Daily Californian (Berkeley: University of California, April 17, 1972), p. 3.

[2] PK, 138, 158, 167; SFS, 7-9. For a fuller treatment of the Lysenko affair, see Morris Goran, The Future of Science (New York: Spartan Books, 1971), pp. 34-39, 43: excellent bibliography.

[3] Cf. Bernard Barber, "Resistance by Scientists to Scientific Discovery," Science, 134 (September, 1961), 596-602; C. C. Gellispie, The Edge of Objectivity (Princeton: Princeton University Press, 1960); M. Goran, "Public Relations and the Heroes of Science," The Chemist, 44 (November, 1967), 397-98; T. J. Gordon, Ideas in Conflict (New York: St. Martin's Press, 1966); and E. Larabee, "Scientists in Collision: Was Velikovsky Right?" Harper's Magazine, vol. 227, no. 1359 (August, 1963), 48-55.

In a larger sense, the operation of authority is an integral part of the epistemological and sociological operation of the scientific enterprise. An apprentice in science must accept his teachers' authority or he will not entrust himself properly to their guidance.[1] He must also accept as normative certain classical experiments and problems; he cannot maintain a take-it-or-leave-it attitude. The assumption must be that the classical solution is correct and he must repeat his performance until he himself learns to arrive at that solution. In so doing he accepts the current scientific opinion as normative even though his historical perspective does not permit him to regard it as the permanent, infallible authority.[2]

The practicing scientist also relies upon the operation of authority in his enterprise. He acknowledges, for example, the personal judgments of his colleagues in those areas where he has only minor competence. He accepts as a competent authority official listings of physical constants and the research published in recognized journals. He relies upon editorial boards to eliminate irrelevant and incompetent contributions even though he knows that, from time to time, a work of genius will be classed as a work of quackery. Research and teaching positions, the awarding of prizes and financial grants--each of these defines sociologically the operation of scientific authority.[1] In all of this, the individual scientist trusts that petty and selfish interests will be of secondary importance to the common ideal of free inquiry followed by open discussion and democratic persuasion.

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[1] SFS, 44-45, 54, 76; PK, 212ff; TD, 55ff.

[2] PK, 164.

Polanyi, in sum, argues that confidence in authority is the epistemological and sociological condition for acquiring and safeguarding the transmission of the scientific tradition. This applies equally to the Christian tradition. While he acknowledges that the Christian tradition oftentimes falls back into an inhibiting authoritarianism, he insists that the functions of authority in the religious enterprise do not differ substantially from the functions served in the scientific enterprise.[2] Authority is basically a service function for safeguarding the perennial transmission and enhancement of truth. Some theologians[3] have arrived at this understanding while the over-whelming majority of philosophers of science give authority no epistemological function whatsoever. Some practicing scientists have even belittled scientific authority and expressed bitter hostility in their memoirs.[4]

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[1] TD, 72, 75; SFS, 15-18, 42ff; PK, 163, 203, 219, 374-78. Cf. also Bernard Barber, "Resistence by Scientists to Scientific Discovery," Science, 134 (September, 1961), 599-601; F. Reif, "The Competitive World of the Pure Scientist," Science, 134 (December, 1961), 1957-62; R. Silverberg, Scientists and Scoundrels (New York: Thomas Y. Crowell, Publisher, 1965); C. P. Snot, Science and Government (New York: Mentor Books, 1962).

[2] SFS, 44-45, 56-59; TD, 62.

[3] John L. McKenzie, Authority in the Church (New York: Sheed and Ward, 1966); Hans Küng, Truthfulness: the Future of the Church (New York: Sheed and Ward, 1968); Avery Dulles, The Survival of Dogma (Garden City: Doubleday and Co., Inc., 1971).

[4] Wilfred Trotter exclaimed that the old guard are possessed by fear of the new. Oliver Heaviside is reported to have said that "even men who are not Cambridge mathematicians deserve justice." Planck laments how his own professors misunderstood his work; how notable physicists ignored or disapproved of his ideas which would eventually win him the Nobel Price. Cf. Barber, op. cit., pp. 596-97.

II. The Impersonal and Impassionate Scientific Judgment

The scientific method ever since its conception has been attached to the ideal of objectivity. From the standpoint of scientists this objectivity has most often meant that the judgments of a scientist must be impersonal and impassionate. An extreme example would be the following:

> The scientific man has above all things to strive at self-elimination in his judgments, to provide an argument which is as true for each individual mind as for his own . . . . The habit of forming a judgment . . . unbiased by personal feeling is characteristic of what may be termed the scientific frame of mind . . . .
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> . . . .
>
> Let me recommend the reader to apply this test to every work professing to give a popular account of any branch of science. If any such work gives a description that appeals to the imagination rather than to his reason, then it is bad science.[1]

This impersonal self-characterization by scientists has been longstanding and so universal that the theological community has seemingly taken this caricature as the starting point for their own dialogue with the experimental sciences. Thus, Alan Richardson contrasts the "calm, detached, 'objective' study" of scientists with the "deeply and painfully involved" judgments of Christians.[2] Paul Tillich contrasts the experimental method with the experiential method under the rubric that the objects of science can "be discovered by detached observation," while the objects of theological inquiry "can be found only in acts of surrender and participation."[1] Donald Evans asserts that "scientific assertions are comprehensible impersonally," while religious assertions demand "a direct correlation with depth experiences."[2] Scientists-theologians follow the same line of demarcation. John Macmurray allows that there are emotional factors involved in the scientist's choice of inquiry but insists that, in itself, "the scientific attitude is exclusively intellectual. What is excluded is any emotional factor."[3] Ian Barbour, a scientist who has devoted much of his life to the scientific-religious dialogue, retains throughout a mutually-exclusive contrast between "detached speculation" and "total participation." "The scientific enterprise is detached and objective, and cannot deal with personal involvement."[4]

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[1] Karl Pearson, The Grammer of Science (3rd ed.; New York: The Meridian Library, 1960), pp. 6 and 10. In the introduction by Ernest Nagel, Pearson is described as an influential scientific thinker who articulated and modified the prevailing scientific opinion regarding the logic of scientific procedure at the turn of the century. Nagel acknowledges that many Anglo-American scientists continue to profess Pearson's self-understanding today.

[2] Alan Richardson, Science and Existence: Two Ways of Knowing (London: SCM Press, Ltd., 1957), p. 21.

Polanyi denounces the ideal of scientific objectivity as impracticable and self-defeating. He understands his program to secure the personal dimension in all knowing against the "crippling mutilations imposed by the objectivist framework" as the counterpart in the scientific field of Tillich's undertaking to purify the Christian faith from religious fundamentalism.[5] When explicit knowledge is examined in its specific instances, Polanyi discovers that the ideal of embodying truth in impersonal statements appears both deceptive and impracticable.[1] The symbols of knowledge may be expressed impersonally and objectively, but the interpretation and accreditation of these symbols always imply personal tacit powers. For example, someone drawing a map uses inter-subjective standard symbols according to a learned art so as to achieve his explicit purpose of representing his personal experience of the terrain in question. A map reader, in his turn, gains explicit directions to guide his movements only insofar as his acquired art of mapreading unconsciously guides his interpretations and judgments throughout. In part these tacit powers are innate (such as the synthesizing process of vision); in part they are formed through participation in a cultural heritage so as to become a "second nature" (e.g. consider an apprenticeship in map making). From this vantage point, both extreme rationalism and extreme relativism can both be recognized for their elements of merit at the same time that they can both be criticized for their lack of balance.

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[1] Paul Tillich, Systematic Theology (3 vols.; Digswell Place; James Nisbet and Co., Ltd., 1964), I, 26 and 50.

[2] Donald Evans, "Differences Between Scientific and Religious Assertions," Science and Religion, ed. by Ian G. Barbour (New York: Harper and Row, Publishers, 1968), pp. 115-17, 127.

[3] John MacMurray, Religion, Art, and Science (Liverpool: Liverpool University Press, 1961), pp. 18-19.

[4] Ian G. Barbour, Christianity and the Scientist (New York: Association Press, 1960), pp. 108-110.

[5] Polanyi, "Science and Religion: Separate Dimensions or Common Ground?" Philosophy Today, VII (Spring, 1963), pp. 11 and 14.

Yet scientists do generally express themselves using impersonal (third-person) language. They do this because they rely upon the universal character of their judgments. They do this because they trust that other scientists would and will share their judgment. Consider, for example, a doctor diagnosing a disease or a chemist identifying a chemical sample. The layman may pick up many of the same clues but only the trained specialist has the tacit skills to correctly assign a "universal" meaning to those clues. Or again consider how a medical doctor, a chiropractor, and a witch doctor (each a highly-trained specialist) allow their trained instincts to carry themselves away into perceiving quite different meanings with respect to diagnosing the same patient. This illustrates that "universal" meanings are limited in scope to participants of a particular intellectual community. The relativity of the personal dimension in knowing will be set aside at this time and will be taken up in detail in the following section. For the moment it suffices to recognize that every consensus of personal judgments has a necessary relationship to the shared organismic skills of the participants in the consensus. The tacit operation of these skills allows the knower to forget that his so-called impersonal judgment rests solidly upon the particular skills his body brings to the knowing event.

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[1] SM, 27.

Most distinctive of Polanyi's synthetic philosophy is the epistemological necessity which he assigns the intellectual passions[1] in the pursuit and accreditation of new knowledge. Ian Barbour and Donald Evans allow that a passionate interest initiates discovery, but deny passions anything but a distorting function when it comes to content of the inquiry itself. Polanyi, in contrast, knows no judgment which does not rely upon self-moving and self-satisfying modes of apprehension. An apprenticeship forms and imposes certain organismic integrations of clues as habitually self-satisfying. The process of discovery enlarges these organismic skills such that a new, more self-satisfying integration discloses the novel manifestation of reality which the investigator was intuitively groping towards. The intellectual passions thus perform indispensible "logical functions" which may be divided (for explanatory purposes) as follows: (1) selective functions, (2) heuristic functions, and (3) persuasive functions. An explanatory paragraph follows for each.[1]

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[1] The recognition of intellectual passions directly undercuts the claim that scientific judgments are emotionally colorless. Quite to the contrary, Polanyi seeks to emphasize that scientists do cultivate a rich sense of intellectual beauty which is recognized within the passionate satisfaction evoked by the formal perfection of scientific theories and the ingenius design of ground-breaking experiments. Such valuations are then inherently passionate and cannot be upheld on the basis of strictly formal logic or noninvolving procedures. Science thus takes its place alongside art, religion, morality, and law. As a system embracing a heritage which is intellectually precious, scientists can thus insist that certain passions are both necessary and appropriate for discerning a scientific worth. Moreover, the excitement of a scientist making a discovery can then be seen, not as a human weakness, but an indispensible element which initiates, sustains, guides, and consummates the entire enquiry. Cf. PK, pp. 132ff.

(1) Selective Functions. The sources for doing science are overwhelming. Unless there is some emotive evaluation guiding the scientist, his attention would "inevitably spread out into a desert of trivialities."[2] However, the intellectual passions of a scientist function to effectively assess his sources such that he can easily ignore what is irrevelant and discern the relative significance of those sources which apply to his interest. This "selective inattention" and "evaluative attention" constitute the selective functions.

(2) Heuristic functions. Without personal powers "which evoke intimations of specific discoveries and sustain their persistent pursuit through years of labor,"[3] nothing authentically novel would appear in the transmission of the scientific tradition. Each generation of scientists would merely repeat the work of their forerunners. In fact, however, the history of science discloses the eruption of novel theories and sig-

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[1] The illustrations will be limited to the scientific enterprise on the assumption that the reader will be quite familiar with numerous parallel illustrations operative within the theological tradition.

[2] PK, 135.

[3] PK, 143.

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nificantly-new discoveries. The most advanced conceptual framework still has the earmarks of being the unfinished articulate expression of genius which prods and inspires others to unfold its fuller degrees of satisfaction.

> Scientific progress seen after the event may be taken to represent the possibilities that were previously hidden and dimly anticipated in a problem. This does explain how different scientists may independently feel intimations of a particular potentiality, often sighting it by different clues and possibly discovering it in different terms.[1]

The groping after a solution thus rests upon a provocative discontent and a passionate anticipation that the solution is already tacitly present--hidden among the clues.

> Therefore, as it emerges in response to our search for something we believe to be there, discovery, or supposed discovery, will always come to us with the conviction of its being true. It arrives accredited in advance by the heuristic craving which evoked it.[2]

Kepler spent his entire life seeking a geometric "harmony of the spheres" upon the conviction that "geometry provided God with a model for the Creation and was implanted into man with God's own likeness." Columbus sailed with mariners unaccustomed to losing the sight of land for the purpose of charting the western route to the Indies. He failed three times, not because his intuitions were wrong, but because an unexpected continent blocked the realization of his end. Mme. Curie was seized by the notion that her uranium ore contained traces of a super-radioactive substance. She did not rest until she had succeeded in isolating it. Planck's dissatisfaction with theoretical accounts of radiation distribution, Bohr's bewilderment at the unaccountable series of spectal lines,

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[1] _TD_, 76.

[2] _PK_, 130.

Cerenkov's dismissal of the long-standing explanations for the light produced by gamma rays in fluids--each of these men felt themselves lured to break out of their traditional perspectives in quest of a fuller self-manifestation of a reality which was yet unperceived. Is this merely a question of lucky hunches? Or are hunches themselves the surfacing of deep intuitions which cause these men to put aside other work, to postpone the company of friends, to stay awake at night?

> The pursuit of discovery is conducted from the start in these terms; all the time we are guided by sensing the presence of a hidden reality toward which our clues are pointing; and the discovery which terminates and satisfies this pursuit is still sustained by the same vision. It claims to have made contact with reality: a reality which, being real, may yet reveal itself to future eyes in an indefinite range of unexpected manifestations.[1]

(3) Persuasive functions. The persuasive functions of the intellectual passions follow directly upon the heuristic functions. Once the heuristic functions have sustained a scientist in his inquiry to that point where he himself is converted from the status quo to a new vision of reality, his intellectual passions are largely converted into persuasive functions which set out "to enrich the world."[2] Thus, despite idealistic rhetoric, no flesh and blood scientist is nonchalantly relativistic when he presents what he has discovered. Quite to the contrary, every scientist believes that his research has led him to a position superior to the one he abandoned and is therefore quite capable of attracting and converting all of his fellow scientists. Yet, history amply attests to the discoverers who have been discredited and spurned by their former colleagues. In the scientific community, the reigning consensus imposes stubborn patterns of

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[1] TD, 24.

[2] Ibid., 150.

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valuation. The discoverer claims to have achieved superior satisfaction--but only as a consequence of his personal process of conversion. He thinks differently. He speaks differently. He is estranged from his own former orthodoxy.

> To the extent to which a discoverer has committed himself to a new vision of reality, he has separated himself from others who still think on the old lines. His persuasive passion spurs him now to cross the gap by converting everybody to his way of seeing things, even as his heuristic passion has spurred him to cross the heuristic gap which separated him from discovery . . . . . .
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> . . . .
>
> Formal operations relying on one framework of interpretation cannot demonstrate a proposition to persons wholly on another framework . . . . Proponents of a new system can convince their audience only by first winning their intellectual sympathy for a doctrine they have not yet grasped. Those who listen sympathetically will discover for themselves what they would otherwise never have understood. Such a process is a heuristic process, a self-modifying act, and to this extent a conversion. It produces disciples forming a school, the members of which are separated for the time being by a logical gap from those outside it. They think differently, speak a different language, live in a different world, and at least one of the two schools is excluded to this extent for the time being (whether rightly or wrongly) from the community of science.[1]

And so it happens that the great systems of orthodoxy are transformed. The personal cost for such transformation is high. Without intellectual passions I know of no satisfactory account which can be given as to how a discoverer can stake his reputation, his career, his life upon an innovation which has not stood the test of time. By way of conclusion, therefore,

> Science, by virtue of its passionate note, finds its place among the great systems of utterances which try to evoke and impose correct modes of feeling. In teaching its own kinds of formal excellence science functions like art,

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[1] PK, 150-151.

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> religion, morality, law and other constituents of culture.
>
> This alignment greatly amplifies the perspective of our enquiry. Though we had noticed before that science claims to appraise order and probability and accredits scientific skill and connoisseurship, those evaluative components of science were emotionally colourless compared with the intellectual passions by which science appreciates its own beauty. If the upholding of scientific truth requires that we justify such passionate valuations, our tasks expand inevitably also to the justification of those equally passionate valuations on which the affirmation of the several domains of culture is predicated. Science can then no longer hope to survive on an island of positive facts, around which the rest of man's intellectual heritage sinks to the status of subjective emotionalism. It must claim that certain emotions are right; and if it can make good such a claim, it will not only save itself but sustain by its example the whole system of cultural life of which it forms part.[1]

The acknowledgment that the intellectual passions undergird both scientific and religious knowing does not therefore cause a confusion between science and religion. The intellectual passions within a scientific apprenticeship are formed differently from those in a religious apprenticeship. The same organismic powers are relied upon, however. The situation is no different with respect to the same set of muscles executing the different skilled performances required by the various sports. The scientist thus relies upon his proper training as a scientist for the pursuit of his scientific inquiry; just as he relies upon his Christian apprenticeship for the proper pursuit of his religious inquiry. Seen from this perspective, scientific and religious passions can indeed be in conflict and no neat subjective/objective or supernatural/natural dualism can save individuals and communities from the anguish such conflicts impose. Teilhard's notion of the mysticism of discovery clashing with the mysticism of revelation for the mastery of the human heart[1] is an apt poetic description of what men have and will experience within a culture wherein the scientific and religious traditions are pursued separately within specialized communities.

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[1] PK, 134.

While it can be granted that religious passions are generally more pervasive than scientific passions, it does not prove helpful to distinguish epistemologically scientific from religious passions. The dedication of a scientist in the pursuit of his discovery may be only qualitatively different from the pursuit of the Christian for the creative forgiveness of his God: both are self-giving. On the other hand, the day in and day out routine learning and routine practice of both science and religion may evoke only mild intellectual passions.

> A transition takes place here from a heuristic act to the routine teaching and learning of its results, and eventually to the mere holding of these as known and true, in the course of which the personal participation of the knower is altogether transformed. The impulse which in the original heuristic act was a violent irreversible self-conversion of the investigator and may have been followed by an almost equally tempestuous process of converting others, is first repeated as a milder version of itself in the eventual acceptance of the discovery by the public, and will thus assume finally a form in which all dynamic quality is lost. Personal participation changes from an impetuous pouring out of oneself into channels of untried assumptions, into a confident holding of certain conclusions as part of one's interpretative framework. The driving power of originality is reduced to a static personal polarization of knowledge; the intellectual effort which led to discovery and guided its verification is transformed into the force of a conviction which holds it to be true--in exactly the same way as the effort of acquiring a skill is transformed into a sense of its mastery. This kind of emotional cascade could be detected on parallel lines over many different domains of knowledge which are originally shaped by pioneers and subsequently held by their successors.[2]

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[1] Teilhard de Chardin, op. cit., p. 177.

[2] PK, 172.

Before going on it may be useful to indicate that both Abraham Maslow and Karl Stern lend support to Polanyi when they find that the objectivist ideal discloses a defensive security system[1] which, in adults, is a serious character neurosis.[2] Thus, in Maslow's analysis, the mature scientist knows emotion to be "synergetic with cognition and a help in truth-finding."[3] The insecure, security-orientated scientist, by contrast, never permits himself to be without tough-minded defenses; he never allows himself a tender-minded, emotional identification with the subject of his inquiry. Stern, in harmony with Maslow, insists that "man, for his creative activity, is in need of a mysterious 'conception' from the female."[4] This is why the ancients evoked the Muses.

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[1] Abraham H. Maslow, The Psychology of Science (Chicago: Henry Regnery Company, 1969), p. 33. Maslow's perspective contrasts "growth science" with "security science." He characterizes security science in much the same way as others (Rollo May, e.g.) have characterized security religion. The following citation more fully illustrates security science:

> Science, then, can be a defense. It can be primarily a safety philosophy, a security system, a complicated way of avoiding anxiety and upsetting problems. In the extreme instance it can be a way of avoiding life, a kind of self-cloistering. It can become--in the hands of some people, at least--a social institution with primarily defensive, conserving functions, ordering and stabilizing rather than discovering and renewing.
>
> The greatest danger of such an extreme institutional position is that the enterprise may finally become functionally autonomous, like a kind of bureaucracy, forgetting its original purposes and goals and becoming a kind of Chinese Wall against innovation, creativeness, revolution, even against new truth itself if it is too upsetting. The bureaucrats may actually become covert enemies to the geniuses, as critics so often have been to poets, as ecclesiastics so often have been to the mystics and seers upon whom their churches were founded.

[2] Karl Stern, The Flight from Woman (New York: The Noonday Press, 1970), p. 2.

[3] Maslow, op. cit., p. 112.

[4] Stern, op. cit., pp. 147-48.

Those who are hyper-active and hyper-rational, Stern believes, fit themselves only for sterile activities in which there is no authentic creativity.

In sum, therefore, our discussion has questioned the impersonal judgment attributed to scientists by directing attention to the organismic skills which form the necessary tacit dimension present in all knowing. The judgment of a scientist may appear impersonal due to his frequent use of impersonal language. In effect, however, each scientist relies upon his personal judgment and trusts that his peers, due to their similar training, will most often arrive at personal judgments similar to his own. The phenomenon of multiple discoveries[1] seemingly gives ample evidence that scientists working independently do often arrive at creative novel judgments independent of each other.

Our discussion has also questioned the impassionate nature of the scientific judgment by showing that without the directed intellectual passions, the scientist would be lost in trivialities, incapable of sustained inquiry, blind to novelties, and easily led to put aside his discovery under the pressure of criticism from his peers. The intellectual passions thereby perform a necessary heuristic function in every discovery-accreditation of new knowledge.

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[1] Polanyi makes only a few passing references to this phenomenon. The present author judges that the phenomenon of multiple discovery directly illustrates that the sharing of a tradition also implies a shared readiness to discover the same new manifestations of reality which are ripe for disclosure. Cf. R. K. Merton, "Resistance to the Systematic Study of Multiple Discoveries in Science," European Journal of Sociology, 4 (1963), 272-82.

III. The Irreducible and Presuppositionless Scientific Facts

At the turn of our century scientists and philosophers of science renewed their efforts to establish the foundations of the experimental sciences free of metaphysical and theological interference. A renewed appeal was made to the irreducible and presuppositionless hard facts which formed the basis of all scientific inquiry. Evolutionists appealed to their fossilized facts.[1] The new experimental psychology of the Wuertzburg School appealed to the facts of perception.[2] The new field theories in physics prompted Machian positivists to consider scientific theories as logical and imaginative constructs which accounted for the regularities present within primary sense data.[3] Finally, the Vienna School of logical positivism of the 20's endeavored to weave the new physics, the new psychology, and the new linguistics into an

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[1] Biblical fundamentalism sought to maintain that Genesis gave the true facts of creation. Metaphysical theologians sought to discover within biological evolution of man's body an adequate place for the independent creation of each immortal soul.

[2] The Wuerzburg School, founded in the 1870's, brought together philosophers, physiologists, and physicists for the purpose of doing basic research in perception, e.g., visual space perception, color sensitivity, time estimation. This ran counter to the classical philosophical psychology which was dominated by Greek metaphysics and epistemology.

[3] Ernst Mach (d. 1916), a physicist by training and a psychologist by interest, sought to secure scientific theories as logical constructs free of any metaphysical implications. The materialistic atomic theories were commonly regarded as pictorial descriptions of a miniature world. The new field theories were predominantly mathematical and thus did not lend themselves to any easy visualization. Thus Mach and his followers gave primary status only to the macroscopic sense data and secondary status to man's imaginative or mathematical description of the regularities within the sense data. Machian positivism is not to be confused with the earlier positivism of Comte; however, the later logical positivism owes much to the influence of Mach.

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all-embracing scientific empiricism.[1]

Each of these attempts to secure a foundation for science in hard, irreducible facts has largely given way to alternative presentations at the present time. None the less, many theologians and some scientists still do present science as rooted in public facts whereas religion must rely upon private "facts" which include personal feelings and values. Alan Richardson, for example, reports that "the scientist can concern himself with what is, not with what ought to be." John Baillie limits the scientist to specifying proximate causes independent of any final causes.[3] Paul Tillich, in like fashion, limits the scientist to preliminary concerns which are independent of ultimate concerns.[4] John MacMurray put it more forcefully when he excludes all value determination from science due to its emotionless objectivity.[5] Christian scientists, during the first half of our century, were by and large, quite content to secure science in the realm of facts and to secure religion in the realm of morals. Robert A. Millikan typifies

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[1] Logical positivism has a wide range of representations and its program has undergone continual modification up until the present. In an excellent historical overview, Herbert Feigl pleads that "there is nothing dogmatic or ritualistic in our movement . . . quite to the contrary, it is a reaction against and an emancipation from the bondage of metaphysical dogma and speculation" ("Some Major Issues and Developments in the Philosophy of Logical Empiricism," Minnesota Studies in the Philosophy of Science, ed. by Herbert Feigl and Michael Scriven [3 vols.; Minneapolis: University of Minnesota Press, 1964], vol. I, p. 4).

[2] Richardson, op. cit., p. 17.

[3] John Baillie, Natural Science and the Spiritual Life (New York: Charles Scribner's Sons, 1962), pp. 16, 19, 38, 41.

[4] Tillich, op. cit., I, 117.

[5] John MacMurray, Religion, Art, and Science (Liverpool: Liverpool University Press, 1961), pp. 12, 15, 19.

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this perspective in arguing for the absence of conflict between science and religion on the basis of their separate domains:

> But now let us go to my second obvious fact and show why in the nature of things there can be no conflict. This appears at once as soon as one attempts to define for himself what is the place of science and what the place of religion in human life. The purpose of science is to develop without prejudice or pre-conception of any kind a knowledge of the facts, the laws, and the processes of nature. The even more important task of religion, on the other hand, is to develop the consciences, the ideals, and the aspirations of mankind.[1]

Polanyi's examination of the so-called irreducible and presuppositionless facts of science shows that the empiricists have not gone far enough. The empiricists at the turn of the century read the history of science and noted that animal magnetism, phlogiston, ether, caloric, electrical fluids, and light corpuscles had been scratched from the scientific textbooks. Rather than admit that the facts of science had changed, they sought to classify as secondary the theoretical notions of science and to regard as primary only the presuppositionless sense data. In effect, therefore, they sought to distinguish the unchanging facts from the changing interpretations.[2] Polanyi, as well as many others,[3] has discounted any easy separation of facts and interpre-

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[1] Robert A. Millikan, "Science and Religion," Christian Education, 6 (1923), 520.

[2] This same program typifies kerygmatic theologians who assume that the Sacred Scriptures hold a permanently valid kerygma which needs to be translated into the culturally-conditioned idiom of every listener. In this perspective changing patterns of belief are relegated to alterations in the form of the kerygma; the substance remains unchanged.

[3] For example, in the social sciences, cf. R. G. Collingwood, The

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pretation.[1] More specifically, Polanyi insists that an interpretation-free perception would mean only meaningless blotches of sense impressions--the condition represented by the new-born infant who recognizes nothing (no-thing) and moves its limbs randomly and purposelessly. Following birth, the human organism strives to organize its perceptions and movements along self-accrediting and self-satisfying patterns. Thereby the organismic powers take on habits of performance which greatly expand the rudimentary reflex actions of blind instinct. The onset of language learning greatly expands and controls those self-satisfying modes of perceiving and acting along the lines of the cultural heritage in which one lives. As a result, adult modes of perception and action take place with ease and satisfaction; their early painful efforts are long forgotten. In consequence primitive peoples with a magical perception of the world do perceive magical facts with a comparable self-satisfying certainty as Europeans who perceive only natural facts.[2] Attempts by

Idea of History (New York: Galaxy Books, 1956); and, in the physical sciences, cf. N. R. Hanson, Patterns of Discovery (Cambridge: The University Press, 1961); and, in the theological sciences, cf. James M. Robinson and John B. Cobb, eds., Theology as History (New York: Harper and Row, Publishers, 1967). Ernest Nagel in his widely recognized text, The Structure of Science (New York: Harcourt, Brace, and World, Inc., 1961), shares Polanyi's criticism of any objectivism based upon sense data even though their current positions are strongly divergent. Nagel in his criticism represents other instrumentalists and operatists in his objection which runs as follows:

> Sense experience normally is a response to complex though unanalyzed patterns of qualities and relations: and the response usually involves the exercise of habits of interpretation and recognition based on tacit beliefs and inferences, which cannot be warranted by any single momentary experience (pp. 121-22).

[1] PK, 135, 171; SFS, 76.

[2] PK, 287ff; SFS, 25-28.

Europeans to give natural explanations to the powers of witch doctors are met with distrust and incredulity by the natives. Even the witch doctor himself experiences the efficacy of his powders only after he has himself performed the proper rite which imbues them with their potency: the notion of their natural potency seems ludicrous.

The conclusion which Polanyi draws from this recognition is that every meaningful experience relies upon tacit skills which are personally acquired during our cultural apprenticeship. Thus, "apart from meaningless sense impressions, there is no experience which abides as a 'fact' without an element of valid interpretation having been imparted to it."[1] Without training nothing is perceived; with training we perceive only what we have been trained to perceive. Empiricists often forget this. The scientific enterprise (as well as the religious enterprise) cannot appeal to any given facts which are not the personal facts which have been venerated in a community and passed down from person to person in the conviction that such facts have been and will be efficacious within their personal well-being. Consequently, science emerges as a system of beliefs worthy of commitment for which no intrinsic justification is necessary or possible. As a personal enterprise demanding long arduous years of apprenticeship followed by painstaking investigations which are only periodically rewarded by breakthroughs and momentous discoveries, the vocation of the scientist admits only of a personal justification (even though the scientist's satisfaction is enhanced by his personal recognition as a valuable contributor to both his scientific and his larger civic community). Polanyi ably summarizes this state of affairs as follows:

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[1] SFS, 89.

> If we fail to realize that the logical antecedents of science are internal to science, they will inevitably appear as propositions accepted prior to the pursuit of science. If we then reflect on them and find that they are not logically inescapable, we are faced with the insoluble problem of finding a justification for them. The problem is insoluble, for it seeks an explanation for a non-existent state of affairs. Nobody has ever affirmed the pre-suppositions of science by themselves. The discoveries of science have been achieved by the passionately sustained efforts of succeeding generations of great men, who overwhelmed the whole of modern humanity by the power of their convictions. Thus has our scientific outlook been moulded, of which these logical rules give a highly attenuated summary. If we ask why we accept this summary, the answer lies in the body of knowledge of which they are the summary. We must reply by recalling the way each of us has come to accept that knowledge and the reasons for which we continue to do so. Science will appear then as a vast system of beliefs, deeply rooted in our history and cultivated today by a specially organized part of our society. We shall see that science is not established by the acceptance of a formula, but is part of our mental life, shared out for cultivation among many thousands of specialized scientists throughout the world, and shared receptively, at second hand, by many millions. And we shall realize that any sincere account of the reasons for which we too share in this mental life must necessarily be given as part of this life.
>
> Science is a system of beliefs to which we are committed. Such a system cannot be accounted for either from experience as seen within a different system, or by reason without any experience. Yet this does not signify that we are free to take it or leave it, but simply reflects the fact that it is a system of beliefs to which we are committed and which therefore cannot be represented in non-committal terms.[1]

From Polanyi's perspective, it thus becomes absurd to endeavor to eliminate systematically all beliefs and pre-suppositions from the foundations of science (or of religion). Consequently, should the program of Machian positivism or of logical positivism succeed, scientists themselves would find themselves caught up in a hopeless relativism which would undermine the very foundations of science. In practice, however, the settled instincts of practicing scientists allow them to largely ignore and resist any such relativization. If the empiricists' formulations of the scientific enterprise ring true, it is only because the practicing scientist tacitly supplements what he hears by what he knows instinctively. The danger here arises when the scientist explains his practice in exclusively empirical terms to the non-scientist who, due to his lack of experience, gravely misconstrues the scientific enterprise. This is evidenced by the fallacious allocation of facts to science and values to religion. Science without values and personal value judgments is untenable.

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[1] PK, 171.

Prominent contemporary scientists now commonly admit personal value judgments do enter into their work but they carefully isolate such judgments of value to the "judgment as to what constitutes worthwhile research, judgment as to what is fit and suitable for publication"[1] or to the judgment as to the technological application of their research and development with respect to human welfare.[2] Polanyi insists that such admissions are half-hearted. He argues that the admission by a scientist that personal values guide the choice and utilization of his research must, a fortiori, bring him to the realization that personal values are implicated in the very content and development of his research.[1] More especially, Polanyi points to the radical changes in mind which accompany the discovery and propagation of novel scientific claims. Such claims are made on the basis that the individual scientist has uncovered a new aspect of reality. He passionately affirms as true with a universal intent his formulations which point to that reality. He willingly risks all sorts of ridicule (and sometimes even physical and psychological abuse) in braving the contemporary scientific concensus of his colleagues. His experience of having wrestled with a problem, ransacking his brain until, finally, in a non-deliberate moment the solution overwhelms him with the force of a revelation--this experience is irreversible and renders him impervious to the old arguments which he left behind.

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[1] Charles A. Coulson, "The Similarity of Science and Religion," Science and Religion, ed. by Ian G. Barbour (New York: Harper and Row, Publishers, 1968), p. 62.

[2] This issue was sharply raised in the U. S. when a group of scientists on the Manhattan Project advised against the use of the atomic bomb and refused any further work associated with nuclear bombs. Cf. A. K. Smith, A Peril and a Hope: The Scientist's Movement in the U. S., 1945-47 (Chicago: University of Chicago Press, 1965) and Morris Goran, The Future of Science (New York: Spartan Books, 1971).

The Nobel Prize lecture of Robert A. Millikan is quite instructive in this regard. He presents a passionate saga of his "direct and unambiguous proof of the existence of the electron" against those scientific "doubters" during the first two decades of our century. He retains, even after fourteen years, a vivid recollection of the truth he discovered which altered the very value structures of his colleagues:

> He who has seen that experiment [the Millikan oil-drop experiment], and hundreds of investigators have observed it, has literally seen the electron . . . . If a man had seen a football which someone told him was the electron he would be far less certain that what he had seen corresponded to reality, than is the man who has become familiar with the foregoing experiment. By its aid he can count the number of electrons in a given small electrical charge with exactly as much certainty as he can attain in counting his fingers and his toes . . . . The electron . . . is neither

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[1] SFS, 38-41; PK, 264, 305; SM, 62; Polanyi, "The Message of the Hungarian Revolution," Knowing and Being, ed. by Marjorie Green (Chicago: University of Chicago Press, 1969), p. 33; Polanyi, "Science and Religion; Separate Dimensions or Common Ground," Philosophy Today, VII (Spring, 1963), pp. 12-14.

> *an uncertainty nor an hypothesis. It is a new experimental fact that this generation in which we live has for the first time seen, but which anyone who wills may henceforth see* [emphasis his].[1]

The truly amazing aspect of Millikan's self-presentation is his total disregard for the sophisticated training which is required to use his apparatus so as to perceive the electron. The untrained observer discovers only tiny oil drops falling and rising between two metal plates attached to batteries. The untrained observer does not and cannot observe electrons. Not even the trained scientist sees electrons *literally*: he must be carried away by the clues offered in the experiment so as to perceive the falling rates of the oil drops as authentic electronic events. Millikan speaks of "newly established facts" relative to his having "literally seen the electron" from the perspective of his own deeply personal satisfaction of having discovered a way to present experimentally the controversial electronic events to his colleagues. His exuberance demonstrates that the issues at the cutting edge of science do indeed call for an alteration of reality-judgments.[2] Millikan's oil-drop experiment sets universally-recognized standards of excellence,[3] which are normative for all future experimentation and theorizing about electronic events. Physical standards are defined on the basis of his experiment. Any scientist who would revert back to the former notion of electrical fluids or some alternate new conception would immediately be suspect: he would have to offer grave reasons for such a change or risk being discredited as incompetent by his orthodox colleagues. In effect, such an innovator would be forced to lead his colleagues through a passionate conversion so as to carry them away into accepting a new standard of excellence regarding the electronic events.

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[1] Robert Millikan, "The Electron and the Light-quant from the Experimental Point of View," *Nobel Lectures*, ed. by the Nobel Foundation, Physics (3 vols.; New York: Elsevier Publishing Co., 1964), II, 58-59.

[2] *SFS*, 65-66; *PK*, 286; *SM*, 82.

[3] *TD*, 33-36, 40-45, 49-52, 55, 85.

From a sociological perspective, the scientist is informed during the time of his apprenticeship with the particular values which are implicit in the current shared practices of the leading proponents of his community. Dissent means affirming new values in the face of old values. No irrefutable, presuppositionless hard facts ever can or ever will form the foundation of a practicing scientific community. What everyone embraces as the settled facts of one era may become the unwarranted former orthodoxy in another era. This state of affairs does not lead to a paralyzing relativism. On the contrary, by reaffirming man's personal responsibility for acquiring the skills to perceive the current conceptions of reality, man knows himself responsible to discover the as-yet-indeterminate future manifestations of that reality and to share his discovery with universal intent. Machian positivism and logical positivism dangerously disregard the human values inherent in the very content of science and thus covertly establish the current facts and current values in science as the eternal, inevitable realities. Consequently they risk leading science into a graver dogmatism and slavish repetition than that which they seek to evade. On the other hand they weaken man's responsible acceptance and enjoyment of values which he embraces for the direction and actualization of his life.

Supposedly man's assimilation of the system of values relative to electronic events is distinct from his system of values relative to social events. Polanyi acknowledges distinct levels of reality which interpenetrate due to boundary control exerted by higher levels of reality upon lower levels. The standards of judgment which enable a biologist or psychologist to determine "health" simply are outside of the norms dictated by physics and chemistry. Even sick and demented organisms do not violate the standards set by physics and chemistry. Consequently, while health depends upon lower level operation of physical and chemical principles of a certain kind; it cannot be totally defined by these principles. Only the operating principles known to the biologist and psychologist can determine health in the organism. Likewise, the sociologist must be led to perceive that the specification of a creative culture is not reducible to the norms of individual biological and psychological health. Societies of men have their own standards of excellence just as do societies of cells.

Polanyi condemns as counter-productive those sociologists who embrace "the doctrine which denies that human ideas can be an independent power in public affairs."[1] In discussing the Hungarian Revolution of 1956, Polanyi accuses sociologists of obscuring their allegiance to the independent reality of truth, justice, and morality by focusing their attention exclusively on the decrease in coercive controls and propaganda, on the complexification of Hungarian society, on the public awareness of faked trials, etc. Polanyi sees these as merely clues. When one focuses on the clues the realities to which they point become obscured. As a consequence, Polanyi rigorously denounces value-free science because it distorts man's understanding of himself.

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[1] Polanyi, The Message of the Hungarian Revolution," Knowing and Being, ed. by Margenau Green (Chicago: The University of Chicago Press, 1969), p. 34. Polanyi is not alone in his insistence that human values must be acknowledged and dealt with in scientific descriptions as efficacious realities. Some of the dominant personalities of our decade exploring this missing dimension and hoping to specify the meaning of human values within scientific inquiry are the following: Ian Barbour, Ludwig von Bertalanffy, Jacob Bronowski, R. W. Burhoe, Barry Commoner, C. A. Coulson, Harvey Cox, T. Dobzhansky, Rene Dubos, Langdon Gilkey, Henry Margenau , Abraham Maslow, M. Polanyi, Harold Schilling, Pierre Teilhard de Chardin, C. F. von Weizaecker. Representative articles can be found collected in the journal Zygon, in Science and Human Values in the 21st Century, ed. by R. W. Burhoe (Philadelphia: The Westminster Press; 1971) and in New Knowledge in Human Values, ed. by A. H. Maslow (Chicago: Henry Regnery Co., 1970).

> It took three years after the rebellion of writers at the Petoefi Circle [in Budapest] for it to be mooted for the first time that this kind of unrest was due to craving for truth. Even then this suggestion was suppressed in deference to expert opinion, because to speak of intellectuals fighting for truth was held to be 'naive and unscientific.'[1]

In sum Polanyi calls scientists back to a recognition of the moral passions which guide their quest for truth. He calls Christians to the recognition that their moral passions do enable them to perceive their facts with the self-same organismic processes that the scientist has claimed as his exclusive preserve. Now if science and Christianity clash it can be recognized that this is so because responsible men in both communities rely upon their apprenticeship to maintain and assert with universal intent their vision of reality and man's personal interrelation with that reality.[2] The facts and values held by both sides of the controversy are no more illusory on one side than they are on

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[1] Ibid., p. 36.

[2] Pierre Teilhard de Chardin provides support for Polanyi's perspective by reformulating the rise of science in the seventeenth century as a veritable "mysticism of discovery. . ." which was vitiated by the honest error of seeking "the mainspring of nature" in the mysteries of the atom. Thus:

> Accidently, owing to its materialistic interpretation of the evolutionary movement it had just discovered in the universe, the religion of science took up a hostile attitude to the God of the Gospels. To this challenge believers in the Gospels had necessarily to reply with condemnation. In this way the only too familiar unhappy war between science and religion

the other: both sides are driven by the intellectual passions implicated in their facts and their values. Each side can legitimately experience the satisfaction of its own heuristic framework and can legitimately believe that it can win over and convert the opponents. Only a society which acknowledges the independent reality of truth and man's ability to lay hold of that truth can allow a democratic process to resolve conflicts.[1] The hope of such a society is that each man will be thereby free to work out his self-actualization within those realities which he himself perceives and be restrained thereto only when he thereby inhibits the inalienable right of others to do the same.

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was born and continued throughout the nineteenth century Some have chosen to see this war as a conflict between reason and faith, but it was rather a struggle between two rival mysticisms for the mastery of the human heart (Human Energy [New York: Harcourt, Brace Jovanovich, Inc., 1969], p. 177).

[1] SFS, 71 ff.

IV. The Indisputable and Reproducible Experimental Testing

A long-standing tradition among scientists has been the understanding that indisputable and reproducible experimental testing stands behind their truth claims. Scientists have contrasted themselves with arm-chair philosophers of nature by emphasizing their ingeneous ability to actively establish controlled situations in which only the pertinent variables are active and other conditions are held constant. Galileo dropping his weights from the Tower of Pisa is the classical paradigm. Aristotelians theorized about falling objects; Galileo actually went out and tested his conclusions. As a result, scientists and laymen have, by and large, believed that experimental testing is the decisive mode of verification within the experimental sciences.

Christians have sometimes endeavored to substantiate their claims on the basis of experimental testing[1] also. In principle, the efficacy of specific prayers of petition were open to experimental verification. Miraculous cures and heavenly visitations were also called upon as supporting evidence even though they did not precisely fit the pattern required by controlled experimentation. Contemporary theologians, however, are quite aware that prayers of petition are frequently unanswered (or given a divine "no," rather than a "yes"). So too most are aware that many physical disorders have psychosomatic origins which are curable by psychiatrists, psychologists, and concerned humanists who have no explicit religious orientation. As a consequence many theologians hesitate to associate religious affirmations with any specifiable testing procedures.

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[1] Some few instances are available of scientists arguing for the empirical testability of religion. E. g., James Houston Shrader, Professor of Chemistry at Eastern Nazareth College, argues as follows:

> The sequence: facts from Jesus' ministry, belief in God based on these facts, and then expectancy of answered prayer . . . . Here we see the formula of the methodology of science: first the observed facts, then on them the formulated hypotheses (doctrines) that make these phenomenon or events meaningful, and finally their validification through verification of prediction (rewards). The two disciplines follow the same procedure ("Science and Religious Faith in Mutual Support," The Christian Scholar, 44 (1961), p. 240).

By and large, however, scientists and theologians have reserved the experimental method as characterizing only the scientific domain. This allows some humanists to propose establishing religious beliefs as part of the scientific enterprise. Consider, for example, the program of Julian Huxley, Religion Without Revelation (London: Max Parrish and Co., Ltd., 1957):

> Experience also shows that assertion, however long continued is not in any way a ground for holding it.
>
> Neither is a claim to be the recipient of a revelation the least guarantee that belief in the subject of the revelation is justified; for both madmen and false prophets have made the claim.

In addition, ordinary language philosophers have clearly pointed out that the existence of unaccountable events of either a public or private nature does not, in itself, verify the explicit faith claims of a believer.[1] In brief they argue that the God-hypothesis is generally only one mode of explaining given events and can never be maintained as the exclusive or undeniable explanation. In effect

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> The method which has proved effective, as matter of actual fact, in providing a firm foundation for belief wherever it has been capable of application is what is usually called the scientific method. I believe firmly that the scientific method although slow and never claiming to lead to complete truth, is the only method which in the long run will give satisfactory foundations for beliefs. The scientific method is the method which, in the intellectual sphere, is the counterpart of that method recommended by the apostle in the moral sphere--test all things; hold fast to that which is good. It consists in demanding facts as the only basis for conclusions; and of consistently and continuously testing any conclusions which may have been reached by new facts and, wherever possible, by the crucial test of experiment, p. 4.

[1] C. B. Martin, "A Religious Way of Knowing," New Essays in Philosophical Theology, ed. by Antony Flew and Alasdair MacIntyre (New York: The Macmillan Co., 1955), pp. 78 ff.

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such philosophers have noted that most religious claims have little or no specifiable meaning because no one seems able to specify what would constitute the conditions leading to the modification or denial of such claims. Anthony Flew, for example, asks:

> Just what would have to happen not merely (morally and wrongly) to tempt but also (logically and rightly) to entitle us to say 'God does not love us' or even 'God does not exist'?[1]

On the basis of this, R. M. Hare concludes that persons are attached to religious claims but that such claims are not open to either proofs or disproofs.[2] Going a step further Thomas McPherson concludes that "religion belongs to the sphere of the unsayable."[3]

In the face of such difficulties, theologians have generally conceded that science distinguishes itself from religion in so far as only science can rely upon experimental testing of its claims. Paul Tillich, for example, denies that revelation imparts any new knowledge. He distinguishes the precise experimental method of verification in science with the imprecise religious verification through its continued "efficacy in the life-process of mankind."[4] Alan Richardson holds that "religious truth is personal and incapable of objective proofs."[5] Donald Evans concurs in admitting that religious assertions are not testable while scientific laws, theories, paradigms, do incorporate various degrees of testability.[1]

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[1] Anthony Flew, "Theology and Falsification," Ibid., p. 99.

[2] R. M. Hare, Ibid., pp. 100-101.

[3] Thomas McPherson, "Religion as the Inexpressible," Ibid., p. 142.

[4] Tillich, op. cit., I, 113-114, 117, 143.

[5] Richardson, op. cit., p. 27.

The upshot of this state of affairs is to recognize that both scientists and theologians mutually agree that experimental testing is the exclusive preserve of the scientific enterprise. Our intention is to put forward a presentation of the scientific method based upon experimental testing and then to show its inadequacy from the perspective of Michael Polanyi. In effect we will be creating somewhat of a straw opponent since most scientists in the last two decades have abandoned this description of science[2] in the face of general historical studies of the evolution of science and, more especially, in the face of the current general acceptance of mutually exclusive scientific theories (e.g. Newtonian and Einsteinian relativity, wave and quantum descriptions for small particles and radiations). The consideration of this recent view will be reserved for

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[1] Evans, op. cit., pp. 118-25, 128-32.

[2] In a careful examination of the Nobel Prize lectures in Physics, Max Born's presentation in 1954 and Polykarp Kusch's presentation in 1955 exhibit a full recognition that experimental confirmations suffice only to indicate the suitability of a particular theory for interpreting the particular phenomenon under investigation. This pragmatic stance replaces the former understanding whereby experimental confirmations were regarded as "decisive proofs" for the ontological reality of the theoretical assumptions. Schroedinger's presentation in 1933 acknowledges that he is forced to grant that his theory is a "mathematical device" with "fictitious significance"; yet, ideally a theory "should aim at nothing more than the description of what can really be observed." Schroedinger thus represents the beginnings of the pragmatic stance with instinctual leanings toward the classical realism voiced by Robert A. Millikan in 1923 and Louis de Broglie in 1929. Within a span of thirty years, therefore, the classical realism of the 20's gave way to the unabashed pragmatism of the 50's. Cf. Physics: Nobel Lectures, ed. by the Nobel Foundation (3 vols.; New York: Elsevier Publishing Co., 1964).

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the following section. Meanwhile this older view will be considered because it represents by and large the understanding of science which most non-scientists currently share.

In brief, the method of scientific testing implies that the scientist can deduce experimental consequences from the formulation of a proposed scientific theory and then proceed to determine whether experimentation does or does not confirm his expected consequences. In the case of an experimental confirmation, the theory is accredited. In the case of a failure, the theory is discredited. The scientist then has the option of modifying the present defective theory or starting over by imagining a totally fresh one.

Experimental testing has been claimed to be especially signiicant for judging between two contending theories. In this case an experiment must be designed which would produce one set of results according to the first theory and a different set of results according to the second theory. Once the experiment is performed the actual experimental results will decide in favor of one theory and discredit the other (assuming that the experimental results matches only one set of the anticipated results). Classically such experiments have been known as "crucial experiments." Crucial experiments are described as playing a major role in the history of science. Galileo's leaning tower experiments showed that a large and small weight fall at the same rate: Galileo's theory was confirmed and Aristotle's discredited. The nineteenth century debate between Newton's corpuscular theory of light and Young's wave theory of light was settled in 1850 by Foucault's ingenious device for comparing the rate of travel of light in water with that in air: the wave theory was confirmed since the light was slower in water (as opposed to the corpuscular theory's expectation that it would travel faster). Pasteur's famous experiment, in which he showed that the exclusion of flies from decaying meat did not produce maggots, effectively countered those who explained the presence of maggots by spontaneous generation. This list could be greatly extended; those we have presented will suffice to illustrate the historical decisiveness of experimental testing in approving and disproving scientific theories.

Polanyi's difficulty with the above description is that it artificially patterns the history of the development of science in such a way that the reader is left with the impression that single experimental tests suffice either to accredit or discredit a novel theory. On the contrary Polanyi is able to show that in numerous instances (a) a new theory is accepted without or prior to any experimental testing, and (b) an old theory is not abandoned in the face of incorrect experimental prediction. Relative to the acceptance of new theories, Polanyi indicates instances such as the following:

> In a period extending close on half a century, no one has been able to find a test for the statistical interpretation of quantum mechanics that we owe to Max Born. Its radically new conception of physical laws as predicting only the probability and not the actual course of events controlled by the law is generally accepted today, though it was originally grounded on no new facts and has never offered factual implications that could test it.
>
> Such unempirical theories can be of supreme importance in all the experimental sciences, including biology. Darwinism is an example of it, and indeed in two senses. First, for seventy years Darwinism was accepted by science, even though its evolutionary mechanism could not be understood in terms of known facts, and second, up to this day no such empirical implications

> of it are known which, if experimentally tested, could disprove the theory.[1]

Relative to the refutation of old theories in the face of incorrect experimental prediction, Polanyi indicates the following:

> . . . It is true enough that the scientist must be prepared to submit at any moment to the adverse verdict of observational evidence. But not blindly. That is what I have illustrated by the example of the periodic system and the quantum theory of light, both upheld in spite of contradicting evidence. There is always the possibility that, as in these cases, a deviation may not affect the essential correctness of a proposition. The example of the periodic system and of the quantum theory of light both show how the objections raised by a contradiction to a theory may eventually be met not by abandoning it but rather by carrying it one step further. Any exception to a rule may thus conceivably involve, not its refutation, but its elucidation and hence the confirmation of its deeper meaning.
>
> The process of explaining away deviations is in fact quite indispensable to the daily routine of research. In my laboratory I find the laws of nature formally contradicted at every hour, but I explain this away by the assumption of experimental error. If every anomaly observed in my laboratory were taken at its face value, research would instantly degenerate into a wild-goose chase after imaginary fundamental novelties.[2]

Our challenge to the use of the model of scientific testing could be pushed much further.[3] For example, many theories (e.g. the corpuscular theory, spontaneous generation, witchcraft) have been overcome in the face of a growing body of seemingly overwhelming and incontrovertible evidence. In addition many theories (e.g. Einstein's theory of relativity, the existence of the neutrino, space travel) were stubbornly accepted even despite long years of non-confirmatory experimentation.[1] Considering the following admission by Millikan:

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[1] Polanyi, "Genius in Science," Archives de Philosophie, 34, 4 (October-December, 1971), p. 601.

[2] SFS, 31.

[3] A classical critique of the fallacious application of experimental testing is provided by Pierre Duhem, The Aim and Structure of Physical Theory (originally published in 1914; New York: Atheneum, 1962). A logical analysis showing the fallacious reasoning supporting experimental testing is provided by Paul F. Schmidt, "Truth in Physics," American Journal of Physics, 28, 1 (January, 1960), pp. 24-32.

> After ten years of testing and changing and learning and sometimes blundering . . . , this work resulted, contrary to my expectation, in the first direct experimental proof in 1914 of the exact validity, within narrow limits of experimental error, of the Einstein equation [relative to the photo-electric effect].[2]

Another factor which inhibits experimental accreditation is the phenomenon whereby accepted theories obscure new processes because scientists become habituated to perceiving them under old habits of thought.[3]

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[1] Polanyi takes special care to show how textbooks have distorted Einstein's discovery of his theory of relativity so as to make it appear that he depended upon the Michelson-Morley experiment. He also shows that D. C. Miller's inability to reproduce the results of the Michael-Morley experiment from 1902 to 1926 with more sophisticated apparatus did not cast any significant doubt upon the rightness of the already-accepted experimental results of Michelson and Morley in 1887. Cf. *PK*, pp. 9-15; and his "The Creative Imagination," *Chemical and Engineering News*, 44 (April 25, 1966), pp. 85, 87-88; also Gerald Holton, "Einstein and the 'Crucial' Experiment," *American Journal of Physics,* 37, 10 (October, 1969), pp. 968-982. Other instances of the inability of scientists to reproduce experimental results can be found in *SFS*, 94-96.

[2] Millikan, "The Electron and the Light-quant from the Experimental Point of View," *op. cit.*, pp. 60-61.

[3] Instances for this are especially evident in the Nobel Prize lectures delivered after 1950. Pavel A. Cerenkov details the difficulties scientists had in even recognizing Cerenkov radiation because scientists had already become habituated to explaining what they familiarly observed as a common instance of luminescence. Igor E. Tamm complains that the successful and prestigious general theory of relativity held up the recognition of the satisfactory explanation of Cerenkov radiation because scientists had assumed that particles could not exceed the velocity of light. Donald Glaser points out that scientists had been using a "basically wrong" electric theory for bubble nucleation for over thirty years with wide successes before his own experientation showed its deficiency in the face of his new "hot track" theory. Examples like this can be multiplied. The psychological difficulty here is that current theories which have a strong commitment seem secure against being defaulted due to the constant reliance which the scientist places upon them. In contrast, novel theories require habits of mind which are untried or unknown within the scientific tradition.

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> To sum up, we have seen examples to show that important scientific discoveries can be made at a glance and established without any subsequent tests; and that there have been great theoretical discoveries which had no testable experimental content at all. We have seen also that a theory interpreting in a novel way a vast range of experience was accepted by science, and then firmly held for many years by science, though its assumptions contradicted the laws of nature as known at the time, and also that it continues to be held by science, as other important theories are, though it has never been testable by predictions that could be empirically refuted.[1]

In the face of these criticisms, what place does experimental testing have within the scientific enterprise? Polanyi deliberately emphasizes the exceptions to the rule of experimental testing in order to show that no adequate rule can be formulated which binds the personal judgment of the scientist. Certainly the scientist designs experiments and relies upon the experiments of his colleagues. However, while the scientist relies upon experiments, he himself knows that only he can judge the reliability and significance of any given experiment. Every belief works in the eye of the beholder.[2] Consequently, every experiment is preferential and prejudicial. Furthermore, every creative theory on the cutting edge of science curiously finds passionate advocates both for and against. Each side puts forward its own experimental evidence. Fundamentally, each scientist must rely upon his personal judgment when it becomes necessary to take a stand. In making this judgment, the scientist relies upon the training he received during his apprenticeship. It is not that his training included the right answer which he has only to consult. Far from it. His training gives him no answer in the tradition, but it has trained his organismic powers so as to enable him to evaluate the experimental clues in such a way that he respects the transcendent values to which scientific inquiry is dedicated.[1] A scientist who does not make personal decisions for fear of being wrong could not in any way be creative and would cut himself off from everything but the routine work of a technician. Rather, each scientist is required to courageously express what his research leads him to judge as worthy of universal acceptance even though he knows that he may sometimes be proved wrong.[2] Thus by way of conclusion:

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[1] Polanyi, "Genius in Science," _op. cit._, p. 602.

[2] _SFS_, 61.

> . . . Scientific conscience cannot be satisfied by the fulfilment of any rules, since all rules are subject to its own interpretation. To verify references, for example, is a matter of mere routine conscientiousness and not of the kind of conscience of which I am thinking here. But real scientific conscience is involved in judging how far other people's data can be relied upon and avoiding at the same time the dangers of either too little or too much caution. And similarly all the more difficult decisions to be taken in the pursuit of a scientific investigation and its subsequent publication and public defence, involve matters of conscience, each of which is a test for the scientist's sincerity and devotion to scientific ideals.
>
> The scientist takes complete responsibility for every one of these actions and particularly for the claims which he puts forward. If his statements are confirmed by others, in whatever form and in whatever manner, even though quite unthought of at the time when he first propounded them, he will claim to have been right. And conversely, if his work is proved wrong he will feel that he has failed. He cannot plead to have observed the rules, or to have been misled by other

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[1] SFS, 72, 78-79; PK, 64; SM, 42-43, 60-61, 68.

[2] The following citation then brings the scientific method and the religious method of verification into alignment. Granting that the degree of self-involvement in religious accreditation is generally greater than in scientific accreditation, we are thus led to affirm that the individual conscience of the believer informed by his participation in a community stands as the basis of what he accredits as true.

An analysis of the testing involved in the critical experiment between the prophets of Baal and Elijah on Mount Carmel (IK 19: 9-14) can be found to follow the analysis suggested by Polanyi in the article by Emil L. Fachenheim, "Elijah and the Empiricists," The Religious Situation: 1969, ed. by Donald R. Cutler (Boston: Beacon Press, 1969), pp. 841-868.

> investigators' evidence or his own collaborators', or that he could not at the time have made the tests which eventually disproved his thesis. Such reasons can serve to explain his error but they can never justify it--for he is bound to no explicit rules and is entitled to accept or reject any evidence at his own discretion. The scientist's task is not to observe any allegedly correct procedure but to get the right results. He has to establish contact, by whatever means, with the hidden reality of which he is predicating. His conscience must therefore give its ultimate assent always from a sense of having established that contact. And he will accept therefore the duty of committing himself on the strength of evidence which can, admittedly, never be complete; and trust that such a gamble, when based on the dictates of his scientific conscience, is in fact his competent function and his proper chance of making his contribution to science.[1]

V. The Pragmatic Accreditation of Scientific Assertions

As was hinted in the last section, most practicing scientists in the last two decades have endeavored to specify their process of inquiry, discovery, and accreditation along pragmatic lines. Basically they deny any explicit or definable metaphysical implications within their theoretical formulations; they accredit their theories as those indispensible guides for inspiring further directed inquiry into unsolved problems or for directing the technological application of already solved problems. Theories function. They guide the problem solving of a scientist in much the same way as a road map[2] guides a driver through the maze of streets and alleys in an inner-city. The task of the scientist is to correct existing maps and to imaginatively construct new ones such that other scientists and technicians have competent guides for their own research and development of new processes and new products.

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[1] SFS, 40.

[2] This analogy limps in so far as the typical problem in research demands an integration of a multiplicity of theories operating on multiple levels of reality. The functional aspect of theories and road maps, however, is the same in four important ways: (1) Road maps are mental dwelling places which require the tacit organismic skills of map reading in order to identify and comprehensively integrate the multiplicity of relevant clues (symbols) drawn on the map. (2) Road maps are held in subsidiary awareness while the driver guides the vehicle with focal attention to those clues along the route which take on meaning (recognition) only in view of their correlation with the anticipated process (route) held in subsidiary awareness. (3) Road maps can be improved by adding greater detail, by correcting errors (which show up as false expectations), by simplifying notation, etc. (4) No single map has a universal scope of application; the driver must know how to choose the maps which best fit his intentions, his vehicle, his point of origin and destination.

While the precise impetus for a pragmatic reconstruction of the scientific self-understanding cannot be fully specified, two developments can be suggested. First, historical studies into the memoirs and journals of creative scientists has disclosed the absence of any single methodology whereby novel theories have been discovered and accredited.[1] Second, the scientific community has become increasingly comfortable with the accreditation of mutually contradictory theories. Thus Einsteinian relativity prohibits perceiving absolute places linked together by the universal flow of absolute time. Yet, for most experimental operations, scientists are content to retain their older classical Newtonian relativity. For some specialized problems, however, the scientists takes on the heuristic framework of Einsteinian relativity. Another instance deals with the acceptance of Bohr's epoch-making quantum theory for interpreting the structure of the atom with regard to the emission and absorption of light radiation. Bohr's theory explicitly put aside the well-established electromagnetic theory of Maxwell and the mechanics of Newton when it came to the depiction of orbiting

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[1] During the last decade the Harvard Project has drawn together and published hundreds of case studies relative to the discoveries made by scientists. James B. Conant, former president of Harvard, was already active during the 50's in correcting misleading stereotypes relative to the scientific enterprise. More significantly, Conant was able to show through his historical studies that there has not been any one method whereby scientific geniuses broke new ground (Science and Common Sense [New Haven: Yale University Press, 1952], pp. 43-45).

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and of jumping electrons respectively. Scientists thus became accustomed to alter their heuristic framework to fit the particular inquiry to which they were attending. This may be thought of as parallel to having a set of maps for navigating through the inner-city. One is for fire engines, another for trucks, another for pedestrians, another for wheel chairs, etc. In every instance, it is never a question of deciding which is the one-and-only true map, but to decide which way is appropriate for the particular logistics problem being faced.

In order to specify the pragmatic interpretation of science I have chosen Henry Margenau's [1] presentation and reduced it to the following three-part exposition:

(1) Reality must be defined pragmatically. The history of science demonstrates that the confirmed beliefs which were accredited by their workability in one epoch pass into oblivion while new beliefs emerge in the next epoch. Thus, the "valid constructs" of each epoch define the "physical reality" for that epoch: "Every entity that cannot be directly observed . . . owes its existence to the pragmatic definition of reality which looks to workability."[2] Man-made constructs "are not valid because they refer to something real; on the contrary, they denote something real because they have been found valid."[3]

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[1] Henry Margenau. The Nature of Physical Reality (New York: McGraw Hill Publishing Co., 1950). Margenau's exposition has strong similarities with P. W. Bridgman, The Logic of Modern Physics (1927) and Reflections of a Physicist (1950); Rudolph Carnap, Foundations of Logic and Mathematics (International Encyclopedia of Unified Science, vol. I, no. 3, 1955); F.S.C. Northrop, The Logic of the Sciences and the Humanities (1947; and Hans Reichenbach, The Rise of Scientific Philosophy (1951).

[2] Ibid., p. 10.

[3] Ibid., p. 292. Margenau and other instrumentalists consider a term such as "electron" as merely a useful calculating device or tool without any specifiable referent. For an exposition and critique of their position, cf. Grover Maxwell, "The Ontological Status of Theoretical Entities" Minnesota Studies in the Philosophy of Science, vol. III (Minneapolis: University of Minnesota Press, 1966), pp. 3-27.

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(2) New constructs must undergo the process of becoming valid. As such, a new construct may be only an "unprincipled speculation." To show its worth, Margenau insists that new constructs (a) must be consistent with common sense and (b) must demonstrate their ability to correlate thought with experiential-experimental results. Constructs demonstrating workability thus become real:

> The tree is real because it is the rational terminus of certain rules of correspondence having their origin in sense impressions and because it satisfies the demands of consistency which common sense imposes. [In like fashion] atoms are real because they are rational termini of other less obvious rules of correspondence having their origin in more refined sense impressions [i.e., via sophisticated instrumentation] and because as constructs they satisfy the demands made by the metaphysical principles of science [i.e. the "existing structure of ordered conceptions"] into which practice and care have transformed the inarticulate maxims of common sense.[1]

(3) Once "reality is conferred" on a construct, "it must be treated as having been real before it was formed."[2] Once "reality is conferred" on a construct, "we cannot enforce that static structure rigidly upon the future."[3] Margenau takes pains to show how the "valid construct" for the neutron has been changing ever since its appearance in 1933.[4] He concludes with "the seemingly unorthodox thesis of a real world in progress, a reality undergoing changes induced by discovery."[5]

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[1] *Ibid*., p. 292.

[2] *Ibid*., p. 305.

[3] *Ibid*., p. 295.

[4] An easily-read laymen's account of how valid constructs evolved for the neutron during the 30's and 40's is presented by Donald J. Hughes, *The Neutron Story* (Garden City: Doubleday Anchor Books, 1959).

[5] Margenau, *op*. *cit*., p. 296.

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Polanyi shares with Margenau his recognition of the processive character of the reality-perceptions within the scientific community. Both authors thus give ample recognition to the historical transmutations in what man identifies as real-for-him (a recognition to which the older positivism was blind). But, beyond this point, Polanyi finds serious defectiveness in the pragmatic accreditation of reality. The following paragraphs will treat three major problematic areas which do not find an adequate response in Margenau's pragmatism.

First, Polanyi notes that "workability" in itself is not a sufficient criterion for accreditating "physical reality" because every erroneous construct, which had been held passionately by competent authorities and the common populace alike, was experienced by them as satisfyingly workable during the period in which it was unchallenged as valid. More simply, workability accredits erroneous and valid "constructs" alike.

> The opinion is widespread that the cultivation of science would always be continued for the sake of its practical advantages. It was expected, for example, that Lysenko's theories, if false, would be soon abandoned by the Soviet Government because they could produce no useful results. This expectation overlooked the fact that such questions cannot be decided in practice. Lysenko's theories are actually the theoretical conclusions which Michurin in Russia and Burbank in the U. S. derived from their substantial successes as plant-breeders. Almost every major systematic error which has deluded men for thousands of years relied on practical experience. Horoscopes, incantations, oracles, magic, witchcraft, the cures of witch doctors and of medical practitioners before the advent of modern medicine, were all firmly established through the centuries in the eyes of the public by their supposed practical successes.[1]

Secondly, as regards workability, the older theories have a perennial advantage in having accumulated massive supportive evidence and having become, thereby, the patterns of scientific practice and the reliable guides for conducting future research. Novelty does not have the advantage of either scope of application nor depth of commitment within the scientific community. Scientific journals are filled with competent and workable novelties. Few of them will ever succeed in converting the recognized giants within the scientificcommunity who, through their research and teaching, fashion the scientific community of tomorrow. Those that are accepted are not and can not be accepted in the first instance due to their simple workability; only the intimations of their enhanced workability over the status quo suffices. The rules for their acceptance cannot be formulated completely, as has been said before. The giants in the scientific community must rely upon the unspecifiability of their personal judgment as regards to what they accept from among the brain-children of their junior scientists. No public opinion poll among scientists would suffice; such polls may define the current consensus but fail to show how that consensus can be changed.

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[1] PK, 182-83. Recently astrologers hailed the 1972 discovery of a tenth planet (300 times the earth-size) as a brilliant confirmation of astrological theory (San Francisco Chronicle [April 29, 1972], p. 4).

Margenau rightly notes that novel valid constructs do (sometimes) emerge as the champions. He offers, however, a very superficial account as to how these valid constructs win out. Does it suffice to say that the scientist is guided securely by "the demands of consistency which common sense imposes"?. "Trees" and "atoms" are weak test cases. In fact every currently-accepted construct of science does seem fully consistent with the demands of common sense. Only at the cutting edge of science does it become apparent that "rules of correspondence," "consistency," and "common sense" do not and cannot, by themselves, settle the issue. Take extrasensory perception as an illustration. Some scientists, guided by their sophisticated common sense, ignore extrasensory perception on the grounds that it is merely a limited instance of the orginary modes of perception (which themselves are not yet fully understood). Other scientists insist that an irreducible novel power of man has been recognized. This second group is calling for a revision in what has been hitherto accepted as common sense. They are asking scientists to revise "the existing structure of ordered conceptions" which guides the practicing scientist.

Polanyi, in contrast to Margenau, insists that common sense does not operate habitually and securely only because it has been informed by the same prevailing consensus. Nearly all novelties are opposed to the common sense of yesterday and are recognized today only because the novelties themselves have transmuted and enhanced common sense. Columbus and his sailors would never have left their port if consistency with common sense was to guide them. The lust for the gold and riches of India could not alone suffice to allow them to stake their lives on a hypothetical shorter route. Only the intimation that their reality-perceptions were true to the way things actually are could allow them to take such a grave risk. In consequence, man affirms what he accepts as reality. He changes his per-

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spective only when he is passionately gripped by a different reality which allows him to overcome the blindness enforced by the former reality. This issue goes back to the beginnings of modern science. Andreas Osiander and Cardinal Bellarmine suggested that the Copernican system ought to be proposed as a superior calculating device and not make reality claims which would arouse the anger of the Aristotelians. Bruno, Galileo, and Kepler insisted that the Copernican system was true and not merely a calculating device. Each suffered for his insistence.

> Was the issue which engaged such minds and roused such fateful passions merely verbal: a question of the proper use of the word 'true'? Actually, both sides agreed on what they meant by 'true,' namely, that truth lies in the achievement of a contact with reality--a contact destined to reveal itself further by an indefinite range of yet unforeseen consequences. I believe accordingly--in view of the subsequent history of astronomy--that the Copernicans were right in affirming the truth of the new system, and the Aristotelians and theologians wrong in conceding to it a merely a formal advantage.[1]

In light of the two problematic areas just indicated, the third and last deficiency of pragmatic science can now be considered. How, on the basis of pragmatic considerations, could a scientist be lured into abandoning his current position so as to stake his reputation upon a novel position? Surely not because the current position lacks practical workability. We have already suggested that every status quo has its merits proven through prolonged application. Furthermore, once the present reality-perceptions are known to be founded in settled organismic skills (which Margenau calls common sense); then, any novelty would seemingly be blocked by the very self-satisfying patterns of action and thought engendered by the status quo. Perhaps it can be granted that some theories are gradually eroded by disuse or by the accumulation of anomalies. But this still does not explain how the scientist is enabled to recognize among the thousands of possible alternatives those which will have a greater workability over the status quo. If the scientist would simply randomly try different alternatives, he would inevitably idle away his time in a discouraging set of dead ends.[1]

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[1] PK, 147. This example is carefully worked out by Polanyi in "Science and Reality," British Journal of Philosophical Science, 18 (1967), 177-196.

The phenomenology of scientific discovery, however, is anything but randomness. The imagination and intuition enter into the problem to be solved. With deliberateness the imagination sallies forth and obscurely holds onto a vision of that reality which it faintly perceives among the clues set before it. As in any problem solving, this is the deliberate racking the brain[2], the struggle to make sense out of the unintegrated clues of which the knowing organism is subsidiarily aware. Some sketches are made, some experiments are tried. Everything at this point is guided by the involuntary intuition which senses a "gradient of coherence" which is felt by the degrees of self-satisfaction that they offer. Finally, with the inevitability of the orator who begins his speech in the firm confidence that his tacit powers will carry him through to a successful end, the scientist arrives at the

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[1] TD, 76.

[2] Polanyi, "Logic and Psychology," The American Psychiatrist, XII (January, 1968), 41; also his "Faith and Reason," The Journal of Religion, XLI, 4 (October, 1961), 243.

[3] Polanyi, "The Creative Imagination," Chemical and Engineering News, 44 (April 25, 1966), 88 and 90. An earlier formulation suggests that a heuristic field can be discerned which implies an attraction to approaching discoveries: PK, 403-405.

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final break-through.[1] Eureka! In a flow of self-satisfying passion the dim reality which he glimpsed in his imagination at the beginning now bursts in upon him with the force of a revelation. His inquiry stops. He knows that he has arrived.

During the process of discovery, the organismic skills of the discoverer have been transmuted[2] inadvertently such that his settled instincts operate along new modes of satisfaction. This is noticeable in so far as his former position no longer satisfies him. Just as the man who has once solved a problem is incapable of reentering the confusion felt at the beginning, so too, the scientist who has been converted to a new reality-perception can find little satisfaction in reentering his former heuristic framework. In effect, his new mode of satisfaction is irreversible. He now sets out to guide his fellow workers into sharing his discovery by arranging clues whereby they might securely and readily be led through progressive feats of novel integrations and likewise share his discovery of the new reality which has given him so much self-satisfaction.

Pragmatism attempts to suggest that this process can be accounted for in terms of the satisfaction of the final success over and above the initial satisfaction (or lack of same). What pragmatism fails to do is to show how the heuristic gap between two states of satisfaction can be bridged. Surely the fiction of testing everything has little feasibility. The scientist only tests what he concludes already has a bearing upon reality. He adopts a new position on the basis of

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[1] Polanyi, "Logic and Psychology," op. cit., 40-42.

[2] SFS, 65-66; PK, 286; SM, 82.

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deep intuitions that the reality which he has discovered has an indeterminate set of future manifestations.[1] The future may alter this optimism. Future testing may show him mistaken.[2] What is certain, however, is that accreditation of novelty relies upon the personal intimation of fruitfulness (not upon already-realized historical successes). Only the classical textbook positions (from hindsight) can be accredited by their de facto fruitfulness. As for a discovery,

> . . . the process by which it will be brought to light will be acknowledged as a discovery precisely because it could not have been achieved by any persistence in applying explicit rules to given facts. The true discoverer will be acclaimed for the daring feat of his imagination, which crossed uncharted seas of possible thought.[3]

In sum, therefore, every attempt to justify the accreditation of science on the basis of workability, consistency, fruitfulness, or aesthetic beauty runs into serious difficulties. Looking backward, the classical theories and discoveries within the scientific community have accumulated and will continue to grow in these qualities. If these are the only criteria however, few novelties could ever gain a hearing. Polanyi has amply shown that apprenticeship within the scientific tradition forms the organismic skills of the apprentice such that he is led to find self-satisfaction habitually within the current orthodoxy. Yet geniuses have claimed to discover novel manifestations of reality to which they dedicate their reputations on the grounds that they hope to convert their entire community to move in the self-same direction in which they have been moved. It is no wonder that most men of genius are not recognized during their own lifetimes; they are men ahead of their times. Polanyi knows that the process of discovery cannot be specified fully.[1] Discovery is a personal process. Some rules can be given, but these are elliptical statements which only the tacit skills of genius can rightly understand and apply. Finally the process of discovery brings home that the enterprise of science is finally attentive to the as-yet-unrecognized manifestations of those realities to which it is presently obligated.

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[1] Margeneau allows that validated constructs are treated as though they were always real, but he makes no infallible claims regarding the future. In so doing he emphasizes the transiency of scientific claims. However, this should not cloud the issue: the affirmation of even a temporary claim involves no less reliance upon a personal judgment than does a timeless claim. In both cases some reality has been perceived; some future manifestations of that reality are expected (even though these manifestations may progressively change or exhibit startling new properties in the future). Cf. TD, 77.

[2] TD, 25; PK, 145.

[3] TD, 76.

> Such are the responsible choices made in the course of scientific inquiry. The choices are made by the scientist: they are his acts, but what he pursues is not of his making; his acts stand under the judgment of the hidden reality he seeks to uncover. His vision of the problem, his obsession with it, and his final leap to discovery are all filled from beginning to end with an obligation to an external objective. In these intensely personal acts, therefore, there is no self-will. Originality is commanded at every stage by a sense of responsibility for advancing the growth of truth in men's minds. Its freedom is perfect service.[2]

It is in this that the Christian enterprise closely approaches the scientific. The Christian is formed so as to perceive his Living God; not only in his past manifestations, but, more so in the indeterminate range of his as-yet-unrecognized future manifestations.[3]

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[1] SFS, 13ff; TD, 25, 75ff; Polanyi, "The Creative Imagination," op. cit., pp. 85, 90, 92; Polanyi, "Logic and Psychology," 27ff.

[2] TD, 76-77.

[3] Polanyi insists that the self-transformation entailed in a religious discovery differs from scientific discovery only in degree. Cf. his "Faith and Reason," op. cit., pp. 244 and 247.

Any system of pragmatic accreditation in religion is sure to run the same self-defeating course as does pragmatism in science. Previous sections have likewise shown that Christianity cannot be served by mimicking any of the other fallacious presentations of science which have also been examined.

In the end, Polanyi calls to a return to a critical realism. His realism, however, brings with it an extensive awareness of the organismic processes which govern every level of perception, from the first recognitions of an infant to the creative discoveries of genius. His realism gives full recognition to the cumulative organismic conditioning occasioned by our commitments (our belonging). Yet, his realism affirms that man can be lured on to transmute his tacit, organismic skills in the process of disclosing new integrations of those incarnational clues of which his body is aware. The experimental sciences have consistently wished to avoid this personal dimension in knowing and have sought (due to their passion for universality) to root themselves in detached judgments, hard facts, experimental testing. Polanyi allows them no rest in these fallacies. For their part the Christian churches have consistently wished to avoid the personal dimension in knowing by rooting their claims in divine authority, miraculous events, infused knowledge. Polanyi allows them no rest here either. Rather, in being sensitive to the irreducible merits of every cultural enterprise, he has endeavored to offer man an adequate vision of himself whereby tradition, authority and belief are combined with shared training, perceptions, and judgments such that men can again rightly appreciate both the merits and the limitations of human knowing. Rooted in the personal, man again can regain his responsible commitments within historic-conditions communities dedicated to the exploration of those realities which secure and bless his living.

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CHAPTER THREE:

REVELATION AS THE PROCESS OF DISCOVERING GOD-FOR-US

A Theology of Christian Revelation
Spelled Out in Five Theses
Within the Synthetic Philosophy
of Michael Polanyi

REVELATION AS THE PROCESS OF DISCOVERING GOD-FOR-US

The task of this present chapter will be to construct a Christian theology of revelation within the framework of Michael Polanyi's synthetic philosophy as it has been spelled out in the two preceding chapters. Polanyi himself has no special training in theological inquiry and largely uses the Christian enterprise as illustrative material[1] alongside the other domains of our culture. The author of this dissertation is convinced, however, that Polanyi does provide both an adequate heuristic framework and an insightful set of Christian illustrations whereby a full-blown theology of revelation can be constructed.

The theology of revelation which follows will be spelled out in five theses which invite a satisfying acceptance as a whole. Only passing references will be made to alternative theologies, and no attempt will be made to criticize our theses from an extraneous framework of thought. No claim is made to completeness; on the contrary, only sufficient development will be attempted so as to enable the reader to enter Polanyi's heuristic circle and to begin responding for himself to those questions which are only tacitly anticipated herein.

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[1] As has been shown, Polanyi's specific intent has been to construct a philosophy of knowing which embraces the scientific enterprise. Nonetheless, Polanyi's religious interests show through and occupy about four percent of his published material during the period 1950-1970.

The guiding presuppositions which preface the forthcoming theses on revelation are the following:

1. The Christian community has handed down from generation to generation not only a rich diversity of rituals and credal formulations but also the tacit skills necessary to sympathetically enter into those rites and creeds in order to be informed by the perception of God[1] which they evoke.
2. The classical rituals and credal formulations were the artistic works of Christian genius and enjoyed extraordinary revelatory power within the milieu in which they were created.
3. Modern man is characterized by his historical perspective. He is habituated to regard his knowing as an experiential relationship which is progressively enlarged with each successive encounter. He rightly recognizes the initiative that he exercises in inquiry and he rightly acknowledges that he is both capable of and responsible for persistently correcting those sectors of knowing over which he enjoys some competence.
4. Modern man ought not to be expected to equip himself with the settled instincts of a bygone milieu in order to render himself capable of sympathetically entering

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[1] The meaning of "the perception of God" cannot be fully spelled out. Its meaning will be grasped or evoked within the clues offered throughout the five theses.

into the rituals and credal formulations which classical genius created. New rituals and credal formulations are demanded which are responsive to the culturally-given perspective of modern man.

5. Polanyi's synthetic philosophy is suitably fitted to nurture a contemporary theology of revelation because it endeavors to respectfully embrace the scientific, artistic, and religious experience of modern man and to find therein the same organismic, sociological, and epistemological processes effectively elucidating the knowing experiences within vastly different sectors of our contemporary culture. Polanyi endeavors also to offset the dangerous and extravagant claims sometimes made by scientific positivism and Christian supernaturalism. By so doing he prepares the way for both science and Christianity to secure their foundations against the menace of radical doubting and moral inversion[1] without separating themselves from the common cultural enterprise in which both are called to present an indispensible service and leadership directed toward a worthy future for mankind.

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[1] Moral inversion means that moral scepticism is combined with moral indignation. This gives rise to an immanent morality clothes in a manifest immorality. The Simbionese Liberation Army provides a current example of persons caught in a moral inversion. See especially Polanyi, "The Two Cultures" and "Beyond Nihilism," Knowing and Being (Chicago: University of Chicago Press, 1969).

Thesis I: The Christian Community functions so as to empower its *participants with the tacit, organismic skill (faith)[1] necessary to perceive God rightly*. The Christian perception of God shares the

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[1] Faith does not have a uniform specification within the Hebraic-Christian tradition. At least three designations can be distinguished corresponding to the Hebraic, Augustinian, and Thomistic perspectives. Within the Hebraic perspective, faith specifies the *wholehearted confidence* in the God-Who-leads-the-Hebrews-out-of-Egypt, in the God-Who-raised-Jesus, etc. Within the Augustinian perspective, faith designates the *inner enlightenment* (illumination) which transforms and purifies the whole man following his acceptance of God's Word as it sounds through Jesus and the Sacred Scriptures. Within the Thomistic perspective, faith designates *a mode of knowing* which contrasts with demonstration insofar as the *intellect is moved inwardly by grace* to accept truths disclosed by God.

The present writer's designation of faith as the tacit, organismic skill necessary to perceive God rightly reflects one choice among many alternatives left open within the perspective of Polanyi. This choice gives preference to the Thomistic tradition which designates faith as an act of the intellect. Thomas designates faith as a habit, as a gift, and as the ground for all the other Christian virtues. The designation herein largely follows this schema. However, since Polanyi's epistemology differs markedly from Thomism, two decisive differences enter in: (1) the experiential gratuitousness of faith is accounted for, not so much as a direct intervention on the part of God, as an indirect intervention operative through a living community which fashions itself in accord with a historic series of revelations. (2) Faith as a true mode of knowing is not distinguished from rational demonstration but, on the contrary, is represented as employing the self-same processes operative in all human inquiry.

Both the Augustinian and Hebraic perspectives suggest alternative designations for Christian faith. If the present writer had given preference to the Augustinian perspective, he might have designated faith as the illumination inherent in Polanyi's analysis of the discovery process. He has found it more congenial to his overall synthesis, however, to allow the discovery process to designate revelation. On the other hand, he does incorporate Augustine's insistence (which Polanyi does refer to in numerous places) that simple acceptance (believing) precedes all knowing and that all knowing is to be accounted for within the same mode (illumination). If he had given preference to the Hebraic perspective, he might have designated faith as a wholehearted entrusting of oneself to God. Here again the present writer has found it more congenial to show that God is not attainable without a wholehearted entrusting of oneself to a heuristic framework fashioned by a community within a historic series of divine self-manifestations. Polanyi himself generally approaches religious faith by designating it as the attitude of self-giving required for preparing the mind to receive a supernatural truth [Cf. *PK*, pp. 197-202 and 279-86; "Faith and Reason," *The Journal of Religion*, XLI, 4 (October 1961), 242-47]. The perspective that the author has chosen same organismic, sociological, and epistemological processes which govern all human knowing.

(A) Faith is a tacit, organismic skill. All knowing, from the elementary recognitions of infants to the creative discoveries of genius, relies upon organismic powers of integration whereby the knowing organism takes the particular clues offered by its sensory and muscular operations and integrates them into meaningful wholes.[1] The Christian faith, then, is herein to be interpreted as that particular organismic skill whereby suitable clues are rightly[2] integrated as disclosing God. In parallel fashion, the appropriate scientific community empowers its participants with the organismic skill necessary

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includes this self-giving as an integral dimension propaedeutic to the habit of faith.

A case could be made for designating as "initial faith" the self-giving attitude necessary for arriving at "informed faith" which operates as a habitual set of tacit skills enabling the Christian to perceive God in the world. An equally effective case could be made for adopting the formula, fides quaerens intellectum, wherein faith designates only the self-giving attitude while understanding is used to specify the tacit Christian skills. In the interests of embracing a large cross-section of the current designations of faith, no such distinctions have indeed been made within the present text. The reader is informed, however, that a certain preference has guided the author of this section which does not rigorously conform to Polanyi and which might be construed otherwise without noticeably interfering with the substantial intent of portraying the Christian process of religious knowing.

[1] PK, 96-100; TD, 29.

[2] The "rightness" of a performance is here specified as determined by the community in which one participates. This allows that diverse communities would uphold diverse organismic skills resulting in a multiplicity of right performances. The multiplicity of Christian sects as well as the multiplicity of psychotherapies (Psychoanalysis, Logotherapy, Gestalt Therapy, Bioenergetics, etc.) illustrates that both science and Christianity are broken down into subgroups with accredit only certain performances as right.

to perceive electrons rightly, and the appropriate artistic community insures that its participants rightly perceive the beauty within polyphonic music.

Each of these various organismic skills functions tacitly. By this is meant that they cannot be caught in the act of their operation. Thus, for example, when a Christian becomes aware of God by being carried away by a ritual or a star-filled sky, his focal attention is directed away from his body to the focus of his interest (which in this case is God and not merely the prayers and stars for themselves). At that moment th Christian retains only a subsidiary awareness[1] of the operations of his body. If he would try to notice his body at the same time, his focal attention would be immediately shifted to his body and he would be distracted from God.

(B) Faith is irreducible and unspecifiable. Every higher-order integrative skill is irreducible to lower-order operations.[2] The organismic powers of integration do indeed rely upon and harness certain neuro-muscular and electro-chemical processes, but they can no more be reduced to them than can the brilliant performance of a violinist be specified in terms of the operating principles known to the physiologist.

Not only is the Christian faith, therefore, irreducible to any set of lower-order operating principles; but it also defies any exhaustive specification in terms of any set of rules.[3] As such, it parallels any skillful performance. The rules for the performance can only rightly be understood by someone who participates in the performance itself.

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[1] PK, 55-59; TD, 4-19; SM, 30-33.

[2] This irreducibility will be returned to in Thesis IV. Cf. TD, 36ff.

[3] PK, 62-65; 328-31; 342; 398; SFS, 14-15, 40.

Consequently it is a mistaken ideal to endeavor to fully specify any skillful performance, whether it be the act of faith or the performance of a violinist. That some great men have accepted rules of operation for their performance does not disturb this judgment; for, it can be shown that it is only their skillful participation in the performance itself which allows certain elliptical formulations to ring true.[1] This would become immediately evident if the rules were given to a novice and he were asked to rival the performance of the master by relying solely upon the guidance offered by his written set of rules.

(C) Faith is a gift. In effect no one is capable of relying upon his own experience in order to reestablish the skilled performances which are passed down from generation to generation.[2] For example, something even as common as the art of cooking could never be successfully reconstructed in a lifetime if someone insisted upon totally ignoring the whole cooking tradition and starting from scratch so as to be directed solely by his own groping efforts. This holds with even greater force when it comes to the Christian faith.

As children we are largely unaware that language stimulation and imitation are the effective vehicles whereby we take on the skilled performances characteristic of our parents and teachers. In so doing we acquire the cultural heritage which includes the Christian[3] faith (in much the same way that the Indian acquires his Hindu faith from his parents). Viewed positively, this early apprenticeship establishes the initial heuristic framework which will enrich the lifetime performance of the individual and secure his entrance into other more specialized apprenticeships. Viewed negatively, this early apprenticeship constitutes the social conditioning which marks the individual with nearly all of his crippling self-perceptions and his blinding social prejudices. As a result, the gift of the Christian faith transmitted to us as children has an inherent ambivalence: it confers both enriching and crippling powers. Every other dimension of our cultural heritage also shares this ambivalence.

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[1] PK, 168-71.

[2] PK, 53-54.

[3] It could be remarked here that the Western cultural heritage in its long and intimate association with Christianity has taken on decisive Christian instincts even when there is no longer any viable reference to "God." There exists, therefore, a laicized Christianity which permeates the organismic skills of those who even renounce Christianity. Robert N. Bellah in 1966 effectively drew the attention of scholars to this fact with his publication of "Civil Religion in America," originally published in Daedalus and reprinted in The Religious Situation: 1968 (Boston: Beacon Press, 1968), pp. 331-56.

The existence of cultures which do not acknowledge any personal supreme deity (such as Buddhism) or which explicitly deny the reality of any deity whatsoever (such as atheistic Marxism) points to the critical realization that the Christian faith is indeed the gift of Christian parents. Dedicated Marxist parents can, in parallel fashion, be said to apprentice their children in the tacit skills necessary to rightly perceive the life-giving and life-securing realities within the Communist style of living. Christianity is by no means innate or instinctual: the perception of Christian realities requires sophisticated organismic skills. Lacking these skills, God's creative activity nowhere appears; given these skills, God's creative activity appears everywhere.

Pushing our characterization of faith as a gift even further, it is worthwhile to note that the tacit, organismic skills which constitute the Christian faith have varied considerably from epoch to epoch. Furthermore, within any given epoch, Christians have been widely at variance with each other as regards to how the Father of Jesus is to be correctly perceived. The various Christian communities which systematically judge other Christian communities to be erroneous or demonic give ample indication of the diversification of Christian faith. In every case, a *particular* community informs its participants with its own *particular* perception of God. From our perspective, then, faith comprises the *particular* tacit, organismic skills which are acquired in a *particular* apprenticeship directed toward participation within a particular community. In other words, each of us acquires the particular gift of faith which is determined by our teachers.

God, therefore, need not be specified[1] (or blamed) as the one who extends a gift of faith to each particular man directly. God, indeed, is the object of faith, and the presence of faith in the Christian community demands the assertions (a) that God was/is/will be present within the world and (b) that man's powers of knowing are commensurate with God's mode of presence. How God can be said to be present within the tangible realities of our cosmos, and how man attains an awareness of the intangible reality of God therein will be taken up in the following theses. It suffices for the moment to acknowledge that God's immanence and man's powers make faith only an abstract possibility. For there to be a realization of this possibility, an apprenticeship is required (save in the germinal instances wherein "god" is discovered from scratch). From this it follows that the actual faith of individuals is dominantly shaped and informed by their teachers. These teachers, in their turn, act as representatives of a historical community of Christians (some of whom are presently living, most of whom are dead [1]).

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[1] A long-standing tradition has assigned God the direct initiative in moving the non-believer to faith. Phenomenologically the Christian is so surprised and overwhelmed by the experience of God that it is quite natural to claim some direct initiative (miraculously) engendered by God. Such a claim may also originate either as an epistemological or a theological necessity (or a combination of both). None of these grounds provides Polanyi with a compelling reason to claim God's direct initiative in the process of religious knowing. In fact, Polanyi's heuristic framework precludes the necessity of assigning God such an initiative. Epistemologically, Polanyi has derived a generalized description of human knowing which applies to scientific as well as religious inquiry. The affirmation of God's direct initiative exclusively in the case of religious knowing would sabotage this program. Ontologically, Polanyi provides a basis for God's presence whereby He can be supremely present without being supremely disruptive. Thus, God would not be expected to disrupt already-existing operating principles on ontological grounds. Conversely, God is reliably known precisely because the self-same organismic, epistemological, and sociological processes are operative within religious knowing as are operative within every other domain of human culture (science included). Other systems of epistemology or theology may indeed necessitate a direct initiative of God to secure the possibility and reliability of religious knowing. It can be neither the intention of Polanyi nor the present author to refute such claims. Our intention is rather to provide an alternative framework in which such claims are neither necessary nor conducive to establishing the reliability of the Christian enterprise. The following theses will make this evident.

(D) The acquisition of faith demands an attitude of self-giving.

Polanyi shows this to be the nature of the case in all domains of inquiry[2] for the following reason: the unitiated cannot judge the inherent worth of a heuristic vision from an independent position outside of the framework itself (which alone can carry one away into the requisite vision which is to be evaluated). Put more bluntly: you can't knock it unless you've tried it. Put more politely: don't criticize another man until you've walked a mile in his shoes. Both of these popular expressions likewise resists any program whereby an enterprise can be judged from outside itself.[1] This holds with the greater force when it comes to the various religious communities. Each community is sustained by a shared heuristic vision which invites surrender. The present religious teachers of a community cannot here-and-now say all that they know. Furthermore, the uninitiated does not yet have either the experiential or listening skills to understand what it is that the religious teacher might wish to express in words.

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[1] This perspective whereby each new individual is gifted (or graced) by the particular community to which he belongs could serve as a point of departure for the classical theology of the Communion of Saints. Thus, with grave honesty it can be acknowledged that our forefathers in faith even though they be dead, do indeed assist the living in their quest to perceive God correctly and to harmonize their activity with his purposes.

[2] SFS, 44-45; PK, 207-209; 265-67; TD, 59-61.

Learning from a teacher means, in the first instance, surrender to his guidance in the expectation that he will lead one to possess the skills which he himself exercizes. The basis of this learning is imitation. Both animals and man find seemingly spontaneous satisfaction[2] in entering into the activity of another through imitation. Both allow the learner to empathetically enter into the mind of his teacher.

Polanyi illustrates this by making reference to the transfer of

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[1] Paul Tillich also denies that any inductive or deductive approach in systematic theology can replace the individual experience, traditional valuation, and personal commitment that a theologian brings to his task. Tillich's doctrine of a theological circle closely approximates Polanyi's epistemology of a fiduciary programme. By contrast, however, Tillich does not extend his doctrine to scientific knowing, whereas Polanyi is especially insistent that every articulate system teaches its adherents to uphold its specific reliability. Cf. PK, 264-268 and Paul Tillich, Systematic Theology, vol. I (Digswell Place: James Nisbet and Co., 1964), pp. 11-14.

[2] Polanyi calls upon the research of W. Köhler with chimpanzees to show (1) that a genuine transmission of an intellectual process takes place within animal imitation (technically known as mimesis) and (2) that animals derive pleasure from the pure repetition of new ingenious manipulations quite apart from practical benefits such acts attain. Cf. PK, pp. 133 and 206. Cf. also Jack P. Hailman, "How an Instinct is Learned," Scientific American, 221, 6 (December, 1969), 98-106.

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performance skills.[1] The strategy of the chess master cannot be examined directly. The student of chess gains a feel of the master's skill by rehearsing his successive moves as though they are the student's own. The mind of a creative scientist likewise cannot be examined directly. His colleagues can hope to understand him only by having the requisite skills to follow his arguments and to enter vicariously into his experimental procedures. In parallel fashion, in Christianity it cannot be displayed by dissecting Christian creeds and rituals. Initially, one must respect that these creeds and rituals hold within them impressive truths which impinge upon sacred realities which the uninitiated cannot perceive.

As such God has rightly been designated as reality visible only through the eyes of faith. And this faith can only be attained by abandoning oneself into the hands of Christian teachers who will guide one through the successive feats of integration necessary to perceive what they perceive. Detachment cannot achieve this. Self-involvement is required. The detached observer or critic has eyes but remains unseeing, has ears but remains unhearing. The Great Spirit is as little in evidence in the sun dance as observed by an average Westerner as is the Holy Spirit in evidence in a baptism as observed by an average (non-Christian) Shoshone (Indian). For this reason faith is frequently depicted as giving sight to the blind and hearing to the deaf. Faith implies an irreversible transformation.

The uncritical self-giving of children provides the fertile ground wherein Christian parents sow the seeds of their own faith. A child

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[1] PK, 204-211; TD, 29-31; SFS, 45.

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learns to pray by assimilating the act of prayer exhibited by his parents. Responding to self-gratifying impulses to imitate, the child reproduces the gestures of his parents. Silence. Head bowed. Hands folded. He repeats the words of his parents or uses the words they suggest. At a later time he will repeat these gestures alone for the purpose of evoking for himself the satisfaction that he found earlier while praying with his parents. Children learn piety by playing at it. Some children make vestments and fashion a tiny altar for the precise purpose of themselves reproducing what they witnessed on Sunday. This role playing accomplishes the indispensible indwelling necessary for understanding acts of ritual. Therein the child progressively assimilates[1] for himself the organismic skills requisite for serving God within his Christian community.

For the adult trained within a Christian milieu, the attitude of self-giving becomes a pattern of life. Each Sunday he abandons himself to the tangible elements of a sacred ritual confident that periodically the ritual itself will carry him away[2] into a compelling and self-transforming vision of God. Now he receives consolation. At another time, guidance and judgment. As in other forms of prayer, the Christian comes away with the conviction that his God has reached out and touched him. God, then, is not (for him) some mysterious reality to be studied within ancient recorded testimonies;

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[1] From this it is now apparent that infant baptism need not be specified as instantaneously infusing faith. Rather, the ritual of baptism gains its efficacy only to the degree that parents (or guardians) heed the call of their community and solidly commit themselves to begin and sustain the long process of apprenticing the child in Christian living. The prayers and the pouring of water generally only have the immediate effect of disturbing the infant; the power of those prayers will be only realized progressively within the long years that follow.

[2] This process of being carried away by tangible clues will be expanded in Thesis II.

rather, he is experienced as a living reality who is the faithful companion in the perilous quest for self-transcendence. Zechariah's song captures just precisely this experience:

> Blessed be the Lord, the God of Israel,
> for he has visited his people,
> he has come to their rescue,
> and he has raised up for us a power for salvation
> in the House of his servant David,
> even as he proclaimed,
> by the mouths of his holy prophets from ancient times,
> that he would save us from our enemies
> and from the hands of all who hate us.[1]

The Christian is taught how to abandon himself to rituals and texts, so as to dwell therein and to experience God. In addition, the Christian fully expects that his favorite prayers and parables have an inexhaustible power of disclosing God in as-yet-unforseen ways. Repetition need not lead to boredom (which desacrilizes and banalizes); rather, repetition can prepare the mind for breaking out of its own settled past into ever richer and deeper disclosures of God. Dwelling in and breaking out mark the whole course of a Christian's insatiable thirst for God.

> The Christian faith in everyday action is just such a sustained effort at breaking out, sustained by the love and desire for God, a God who can be loved but not observed. Proximity to God is not an observation, for it overwhelms and pervades the worshipper. An observer must be relatively detached from that which he observes, and religious experience transforms the worshipper. It stands in this respect closer to sensual abandon than to exact observation. Mystics speak of religious ecstasy in erotic terms, describing communion with God or with Christ as the union of bride and bridegroom. In the orgiastic rituals of fertility cults religion and sensual fervour are openly blended. But religious ecstasy is an articulate passion and resembles sensual abandon only in the surrender achieved by it.
>
> This surrender corresponds to the degree to which the worshipper dwells within the fabric of the religious ritual, which is potentially the highest degree of indwelling that is conceivable. For ritual comprises a sequence of things to be said and gestures to be made which involve the whole body and alert our whole existence. Anyone sincerely saying and doing these things in a place of worship could not fail to be completely absorbed in them. He would be partaking devoutly in religious life.[2]

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[1] Luke 1: 68-72.

[2] PK, 198.

It must be remembered here, that the Christian apprenticeship does not offer its initiates God. Nor can it be said that the Christian community creates for its initiates a perception of God. Rather it must be said that the apprenticeship trains the initiate to use his powers to perceive God within the particular modes sanctioned by the shared faith of the Christian community which accepts him as an apprentice.

The same conditions prevail in non-religious communities. Whether one considers astrologers or astronomers, chiropractors or doctors of medicine, Freudians or Jungians--the realities important to each of these communities only appears following the appropriate apprenticeship. Each teacher imparts to his apprentices his own skills for perceiving the realities which he honors with his community. The realities themselves do not directly impart faith; but their self-manifestation is the prior condition for their being recognized within particular modes and for their being experienced as exerting particular obligations[1] upon those who would harmonize their activity with them so as to secure the greatest blessings.

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[1] Our appraisal here acknowledges that every reality insofar as it is perceived as real must be taken into account. Thus, the individual can be said to be obligated by reality (without personalizing the reality which makes its presence felt). When the astrologer does experience the stars as guiding his personal destiny, he is obliged to discern how the stars are particularly disposed toward him. The astronomer, meanwhile, who does not perceive this guidance of the stars is not obliged to take them into account relative to his future plans in the same way that the astrologer must. The astronomer, however, does take the stars into account in his observations and his theorizing: he must design his instrumentation so as to correctly respond to their particular modes of self-manifestation, he must formulate his theories such that the widest range of perceived characteristics of the stars are suitably accounted for. Thus, it can be said that both the astronomer and the astrologer freely oblige themselves to harmonize their activities with the particular astral realities to which they are respectively attentive so as to secure the specific benefits which each anticipates.

The manifest plurality of Christian faiths should not be undercut with the consolation that each has simply caught a facet of the inexhaustible depths of God. Such a formulation points to the abstract similarities among Christians and tends to overlook their concrete uniqueness. True, the Unitarians and Christian Scientists do sometimes employ the same phrases and do sometimes engage in similar activities; yet, a Unitarian religious service would scarcely evoke in a Christian Scientist any dimension of his religious self-understanding. From the diversity of Christian faiths, it can be understood that the Christian enterprise cannot be reduced to the abstract recognition of a supreme god. God is sought in His specificity and not in His abstract generalities. God is supremely interesting because He is supremely self-involving in His creativity. The Christian, therefore, does not content himself to know that God is; his interest centers upon how God is such that he can harmonize his activity with the divine initiatives. This is the recurrent theme of the historical narratives of the Old and New Testaments.[1] Even primitive man was aware that the cosmic agricultural powers did not bring to life and fruition just any "dead" seed buried in just any manner at just any season. The blessings of the abundant harvest follow only when man cooperates correctly with the cosmic powers. When this cooperation is lacking or mistaken, primitive man knew that the agricultural powers were diminished as witnessed by the wretched harvest. So too, man himself was diminished (sometimes even to the point of starvation). Contemporary Christianity is similarly situated. The blessings of God's creative activity sorely depend upon man's ability to perceive God rightly. An erroneous faith not only fails to secure the blessings of God's creativity, it reaps the self-destructive curses whereby a man's life is diminished.

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[1] Within the Old and New Testament, prophetic discernment is continually called for. Ahab, King of Israel, for example, and his military adversary, Ben-hadad, King of Aram, are both want to consult their respective prophets so as to discern if, how, and when they ought to conduct their battles so as to harmonize their activities with what they perceive to be the character of Yahweh's initiative (cf. I K 20). The prophets, themselves, are generally depicted as in direct conflict with opposing prophets. The Mt. Carmel discernment dramatizes this conflict by depicting Elijah as holding his own against four hundred and fifty prophets of Baal (cf. I K 18:20ff). In even more dramatic fashion, Micaiah challenges the four hundred prophets of Yahweh saying that "Yahweh [himself] has put a lying spirit in the mouths of all his prophets" (I K 22:22). From this it is clear that an affirmation of God's existence is of little interest; rather, how-God-is-existentially-disposed is of critical interest.

The discernment in the New Testament is more subtle; yet, it loses none of its critical importance. The relatives of Jesus are certain that he has gone berserk; the scholars from Jerusalem judge that he is possessed. The Christian discerns Jesus differently (cf Mk 3:20ff with parallels).

(E) Faith is tenacious and not directly corrigible. How this is so follows from what has been explained above. Without an apprenticeship, we perceive nothing; with an apparenticeship we perceive only what we have been trained to perceive.[1] Consequently, in being embraced and lifted up by our cultural heritage (and made to stand on the shoulders of giants); our organismic powers of integration are shaped along given self-sustaining and self-satisfying patterns which are passionately enforced with each new successful operation which anticipates more-

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The ninth chapter of John is entirely devoted to the question of the conflict of discernment regarding Jesus. The tenth and eleventh chapter of the Acts of the Apostles elaborates in detail how Peter's judgment relative to the pagans was completely altered due to his sophisticated discernment of God's initiative in their regard. All in all, it can perhaps be said that the entire Christian self-understanding is rooted in the radical discernment of Jesus as to how God's initiative was presently active within the milieu of his hearers. Christians, in their turn, have been struggling ever since to correctly discern the character of God's reign. The four classical gospels stand as indicators that not even the primitve communities were of the same mind when it came to the precise character of this discernment.

[1] PK, 299, 305, 316.

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expansive future applications.[1] Occasional failures are overlooked and quickly forgotten. Logical arguments against the faith always come from skills outside the faith itself, and thus leave it unaffected. Faith, therefore, ushers one into a stable heuristic circle of settled instincts, which are not directly corrigible.[2]

In saying this it should not be implied that faith does not undergo modifications. Quite to the contrary, every operation of faith leaves its imperceptible modification. In the same way that our language skills are modified (strengthened and altered) with each application;[3] so too, the faith of a Christian is modified with each new act of religious worship.

Faith is only explicated through its operations and the faith that believes differently and prays differently and guides living differently is indeed different in its tacit dimension. Parents sometimes lament the changes that they find in the developing faith of their sons and daughters; yet, the changes in the social texture in which their children move and thrive require them to perceive God differently if they are to perceive him at all. Consequently the Christian faith evolves with culture and even takes on different nuances within various communities sharing the same civic culture.[1]

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[1] PK, 96 ff.

[2] SFS, 42 ff; 58 ff; PK, 269 ff; SM, 16-26. The tenacity of faith does not, per se, exclude doubt or conversion to another faith. The process of doubting and/or conversion, however, relies upon skills which are acquired outside of the traditional apprenticeship of the community. This process will be suggested in section E and fully described in thesis III.

[3] PK, 91-93.

(F) Faith is a responsible self-giving. In so far as faith is embraced in a childhood apprenticeship and encloses one in a particular heuristic circle which generally determines the whole mode of one's lifelong self-fulfillment, it seems to be reducible to the circumstance of our birth. In effect the continuation of human civilization of any kind relies upon the keen powers of imitation whereby children quickly and accurately assimilate the tacit organismic skills of their parents. Within this perspective, the very continuation of the Christian faith demands a sympathetic apprenticeship followed by a lifelong dedication in which there is the positive duty[2] to pass on to the upcoming generation the very fullness of that personal achievement to which the tradition gives rise. Failure to be able to do this would mean the rapid decline of the tradition such that after a few generations it might be lost entirely. The most precious possessions of our culture are carried in frail vessels. This can be seen, for example, in the pitiful attempts of men equipped with sophisticated tools, electronic instruments and theories of resonance to even match the quality of those violins which the uneducated genius of Stradavarius turned out as a matter of course. The Christian faith, in its turn, is historically vulnerable (even though its present vitality gives ample assurance that it is implausible that it should fail in the forseeable future). Its continuance as an empowering enterprise in our culture relies upon its ability to sustain the self-giving efforts of its adherents. Thus the reverent submission of candidates to Christianity takes on the aspect of a dedication necessary for the continuance of Christianity.

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[1] This might be illustrated in the liturgical and credal differences which distinguished the Christianity of Constantinople from that of Rome culminating in the Eastern Schism during the eleventh century. Nuances in faith are already evident in the various gospels (canonical and apocryphal), and the Protestant sects today exhibit a wide range of traditions, each of them rooted through a different historical community back to Jesus Christ. As has been pointed out in section B above, each community can legitimately insist that a certain faith performance is "right" and "necessary" for participation within its community. This allows for the historical, cultural, and experiential relativity of truth. As will be shown, however, there is no implication that truth is thereby arbitrary--each individual encounters God and holds to what he has discovered with universal intent.

[2] PK, 321-24.

That this dedication is necessary does not necessarily signify that it is also responsible. It is sometimes supposed that the apprentice exercises critical faculties[1] which allow him to judge the worthiness of his anticipated engagements. This is true, but only within restrictions that are generally overlooked. Even the adult apprentice cannot judge the performance of his masters because he cannot presume to enjoy discernment in matters over which he as yet has no competence. If an apprentice would be overly critical[2] of his masters, he would thereby block his ability to enter into a reverend imitation of their example. Thus the responsible choice of an apprentice bears upon the choice of his masters[3] rather than any discernment he might have over the nature of their performance.

On the other hand, the master who does not awaken the critical faculties of his apprentice and encourage marks of originality in his performance cannot expect that his apprentice will be capable of anything more than a banal repetition of some aspects of his own performance. An effective apprenticeship, in contrast, enables an apprentice to take a stand within the tradition of his masters and even to rival their performance. In some instances, the originality of the disciple sometimes leads him to take a stand opposed to his masters, but he does this solely on the grounds that he has competently discovered a fuller reality which ought to be capable of converting and enriching his whole tradition.[1] As applied to Christianity, this means that the Christian's training to perceive God opens him effectively to discerning the call of God in modes not explicitly foreseen by his teachers and ministers. Such a revelatory act implies a passionate conversion to the service of the living God and thereby safeguards an authoritative tradition from imposing a banal servitude to worship (idolatrously) some past reality. How this revelatory act preserves the Christian dedication as a responsible self-giving will be more fully spelled out in Thesis III.

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[1] This applied to adults only. In the case of children the critical faculties of their parents takes responsibility for judging the worthiness of their training.

[2] SFS, 44-46; PK, 264 ff; TD, 61-62.

[3] SM, 86-99; PK, 266.

Thesis II: God is not perceived directly (as-He-is-for-Himself), nor tangibly (as are stones), nor miraculously (as literally-interpreted visions and auditions). Rather, God presents Himself in the world (as does every other intangible reality) by offering organismic clues assimilable by the particular sensorimotor powers of the knowing organism. The Christian, having assimilated suitable bodily clues, is enabled by his faith (as specified in Thesis I) to be carried away into perceiving God-for-him as the integrated meaning of those clues.

(A) Having explored the significance of faith as the requisite skill enabling the Christian to perceive God, the second thesis goes on to specify the process wherein God appears. Ever since Thomas Aquinas distinguished revelation as a process essentially different from that of reason,[1] Christian theologians have been accustomed to declare the knowing of God an exception. Our guiding contention here is that God Himself is exceptional; yet, the process whereby He is known must respect the contingencies of human processes. As a consequence, firstly it shall be shown in what manner God cannot be perceived; and, secondly, Polanyi's epistemology will be used to specify in what manner God can be perceived.

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[1] SFS, 15-17, 55-65; PK, 150-159, 164-174.

God cannot be perceived directly. Thomas Aquinas established this position on the basis of the gap that exists between our comprehension of creatures and the Uncreated First Cause.[2] God's transcendent Essence, God-as-He-is-for-Himself, is unknowable. The via negativa can here only rationally conclude what God is not: i.e., that He is not composed, that He has no principle of limitation, that there was no time in which He was not, that there is no place in which He is absent, that He cannot either gain or lose in his boundless self-actualization, etc. Yet, Thomas did assert that God's existence can be known insofar as the activity and perfection of created things demands an Uncaused Cause.[1] The activity and perfection of creatures, therefore, points, via eminentiori, to the Uncreated Activity and Uncreated Perfection. Hence, while God cannot be perceived directly, He manifests himself through His creation. Furthermore, it will be understood that, according to Thomas, Jesus is a creation, supernatural grace is a creation, Biblical inspiration is a creation, all miracles are His created activity,[2] etc. In effect, the Uncreated One is manifest exclusively in His created works. Even the blessed in heaven see God face-to-face due to the created grace of the beatific illumination[3] which enables them to perceive God independent of their bodily senses. And going even further, Thomas asserts that not even the soul of Christ can comprehend the divine essence:

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[1] Thomas Aquinas distinguishes two sharply contrasting modes for acquiring an understanding of God: (1) "an assent by the natural light of reason, through created things" and (2) "a descent, by the mode of revelation, of divine truth which exceeds the human intellect." Cf. his Summa Contra Gentiles, I, ch. 3, sec. 2 and ch. 7, sec. 1 and his Summa Theologica, I, q. 1, a. 5 and 8.

[2] Thomas Aquinas argues that when "the mode of anything's being exceeds the mode of the nature of the knower, it must result that the knowledge of that thing is above the nature of the knower." Thus man whose nature exists only in individual matter cannot attain to the knowledge of any incorporal being. Cf. his Summa Theologica, I, q. 12, a. 4.

> The infinite is not comprehended by the finite . . . .
> . . . .
> Not even in the union by personal being does the human nature comprehend the Word of God or the Divine Nature, for although it was wholly united to the human nature in the one Person of the Son, yet the whole power of the Godhead was not circumscribed by the human nature.[3]

Returning now to Polanyi's philosophy, additional considerations must be made. Consider, for example, that Polanyi's epistemology

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[1] Thomas writes as follows: "Our minds cannot be led by sense so far as to see the essence of God, because the sensible effects of God do not equal the power of God as their cause . . . . But because they are His effects and depend on their cause, we can be led from them so far as to know of God whether He exists, and to know of Him what must necessarily belong to Him as the first cause of all things, exceeding all things caused by Him." (Summa Theologica, I, q. 12, a. 12)

[2] The principle effective here is the following: "God provides for everything according to the capacity of its nature. Now it is natural to man to attain to intellectual truths through sensible things, because all our knowledge originates from sense. Hence in Holy Writ spiritual truths are fittingly taught under the metaphors of material things." (Thomas Aquinas, Summa Theologica, I, q. 1, a. 9).

[3] Thomas Aquinas, Summa Theologica, III, q. 10, a. 1, ad. 1.

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requires not only that God cannot give Himself directly but that not even material things can give themselves directly in the human mode of knowing. All knowing is relational. All knowing is organismic. Consider, for example, this stone picked up from the creek bed. It presents itself as greenish, as flat, as slimy, as repulsive, etc. It cannot offer itself directly as-it-is-for-itself. At every encounter, it can present itself only as the knowing organism is capable of receiving it; i.e., as greenish, as flat, as slimy, as repulsive, etc.[1] Polanyi gives preference to the notion of indwelling[2] as the mode whereby the knower assimilates clues organismically and relationally. The stone cannot be directly assimilated. The knower must remain the other who dwells within his body and feels therein the clues offered by the stone. With regard to the perception of God, it is manifest that it can be no different.

In this context, it can now be understood that the perception of God is a human affair. Man knows nothing of God as-He-is-for-Himself. From the side of the human knower; God appears only as-He-is-for-man. The uniqueness of God is not thereby called into question. Rather, what is insisted upon here is that God's uniqueness must respect man's organismic uniqueness (otherwise there would be no question of a man perceiving his God). Thus, how the angels perceive God is of the same order of incomprehensibility and inutility as how the catfishes perceive God: neither is suitable for man. Would an angel or a catfish be enabled (miraculously) to speak of their perception of God, they would forcibly rely upon a humanly-comprehensible language. Yet, every such human language has been fashioned in the crucible of human experience which would simultaneously both make the language itself unassimilatable to a non-human and restrict the experience communicated to human experiences (and thus fall short of communicating either angelic or catfish experience). Hence, it follows that even if the visions and auditions of God found in the Sacred Scriptures were to be understood as miraculous communications; nevertheless, even in this God must make Himself known in the frail vessels fashioned by human experience. As a consequence, even the strictly literalistic interpretation of Scripture cannot avoid a confrontation with the very mytho-poetic nature of all communication--even if Scriptures be the direct communication from God.

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[1] This notion can be brought home quite forcefully by imagining how the sensorimotor apparatus of the catfish might perceive the self-same stone. For example, the catfish might experience the stone as a tasty banquet platter.

[2] TD, 16-18; PK, 59ff, 165.

No escape from this problem is found by insisting that God communicates wordlessly within the recesses of man's being. This only thrusts the problem back one step further and requires that the human meaningfulness of tacit knowing be explored. Polanyi's epistemology is admirably suited to do this, but this expenditure would be of little fruitfulness here since our intention is not to refute existing theories of divine revelation. Suffice it to say that any miraculous, wordless communication can have no place within the public arena unless the man who has heard God gives human expression to that which he has heard.

Finally, God is not perceived tangibly as are stones. A stone gives itself to the grasping, squeezing, pounding, scratching gestures of human hands. This is not the case with God. Specifically, the Hebraic-Christian tradition has insisted that a tangible god is merely an idol. Classical theology applied the category of the immaterial (or spiritual) to God. Yet, the experience of intangibility also applies to a host of other realities: to an electron, to the strategy of a chessmaster, to justice. None of these realities reveal themselves to the grasping, squeezing, pounding, scratching gestures of human hands. Yet, these realities do give themselves through bodily clues, and those who have the requisite skills to integrate the meaning inherent in these clues are able to perceive these realities. Thus, the scientist relies upon his organismic skills to be able to perceive electronic activity hidden within the clues offered by his tangible experimental apparatus. The strategy of a chessmaster is incarnated in the clues offered by his moves in a tournament; only another chessmaster can discern the strategy therein. Justice is discovered within the activities of a particular juridical procedure; legislators, lawyers, jurors are required who are capable of discerning justice from its counterfeits. God, also, participates in this same intangibility such that the mode wherein He is perceived is more akin to the perception of electrons, strategy, and justice than to the perception of stones. How God is to be perceived as an intangible reality must now be spelled out in fuller detail.

(B) The perception of God-for-us takes place within sets of clues which have a certain intrinsic interest in themselves. Thus, the Christian who finds God in a star-filled sky or in the love of his intimate friend must know that the sky and the friend are already themselves recognizable products of self-fulfilling integrative skills. Even religious rituals employ common objects such as words, embraces, candles, bread. The perception of God, therefore, always requires that the Christian be carried away by the clues in order to perceive them rightly as manifesting God-for-us. The process whereby this takes place initially will be spelled out in the following thesis. Our intention here is to note that the perception of God and the perception of electrons both require that the would-be-perceiver allow himself to be carried away by the tangible clues offered for his inquiry.

Consider, initially, the process whereby a tangible cobblestone manifests its presence. The cobblestone has gross tangible qualities to which our organism directly response. Our tacit integrative skills directly disclose whether this given stone is familiar or unfamiliar, whether it is smooth or rough, whether it has common or unusual colorations, whether it is suitable for flicking over the surface of a pond or not, etc. All of these aspects of our perception of a given stone are rooted in a multiplicity of assimilated clues of which our organism is only subsidiarily aware. The following diagram[1]

$$s \longrightarrow f$$

incarnational[2] clues offered by the stone as assimilated by the knowing organism	the integrated perception of this stone

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[1] The diagrams used in this section are adapted from Polanyi's own usage as found in "Meaning" (unpublished lecture, University of Chicago, May 26, 1970), 20 pages. Such phrases as "intrinsic interest," "being carried away," etc., as used in this section represent Polanyi's later thought and do not occur in his earlier works within the same explicit terms. Cf. Harry Prosch's development and expansion of Polanyi's diagrams in his "Cooling the Modern Mind: Polanyi's Mission" Skidmore College Bulletin, 56, 4 (August, 1971), 39 pages.

[2] The stone offers itself to the knowing organism within bodily clues (sensorimotor stimulus-responses). Incarnational clues thus signifies clues in carnum (Latin: in the flesh). This phrase has been coined by the present author for its rich theological associations. Polanyi would ordinarily use organismic/bodily clues here.

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illustrates the process involved. This diagram may be interpreted as follows: the subsidiaries ("s"), viz. the incarnational clues offered by the stone as assimilated by the knowing organisms, have a bearing upon ("→") their focus ("f"), viz. the integrated perception of this stone. This integrated perception, from what has been said before, relies upon an acquired "faith" (i.e. the particular organismic skill necessary to perceive cobblestones).

Within our lost infancy there was the initial, uncomprehending groping with unintegrated clues. Each successive experience with cobblestones has enriched the range of clues to which the knowing organism is attentive. Thus, the infantile gropings may be illustrated as follows:

f
incarnational "clues" offered by
the stone as assimilated by the knowing
organism

The focal attention here gropes from felt experience to felt experience not yet comprehending them as clues. Finally, a whole emerges:

$$\begin{tikzcd} s \arrow[r] & f \\ \text{incarnational clues} & \text{this stone} \end{tikzcd}$$

From that moment onward, the clues are not felt (save subsidiarily), only the stone is felt. In effect the first recognition requires that the knowing organism discover the meaning of the clues offered. Each successive integration both rediscovers the initial integration and enhances it by associating with it novel revelations not explicitly foreseen in the initial integration. Thus the knowledge of a geologist can be traced in a long series of discoveries which go all the way back to his childhood discovery of stones.

The perception of an electron differs from that of a cobblestone.

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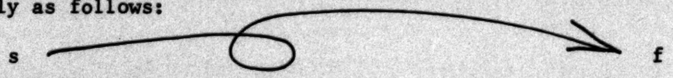
A cobblestone offers gross tangible clues; an electron does not. Millions of electrons are required for an electric shock to be felt. In the face of this difficulty, Millikan worked for over ten years endeavoring to design an apparatus which would allow the isolation and observation of the electrical activity of a single electron. In 1909 he succeeded. By observing oil droplets falling between two charged metal plates with a microscope, Millikan perceived not only the uniform electrical activity of all electrons but he clearly distinguished the activity of one, two, three, or more electrons in isolation. The untrained ("faithless") experimenter is faced only with the gross tangible qualities of Millikan's apparatus. The metal plates, the oil drops, the microscope, etc., have an intrinsic interest in themselves and serve to hide the electronic activity. In manipulating the apparatus, however, Millikan and similarly-trained experimenters are carried away by the tangible clues into the perception of the electronic activity manifested therein. This may be represented diagrammatically as follows:



incarnational clues offered by skillfully manipulating and observing the properly designed and properly working apparatus	the activity of one, two, or more electrons is perceived; each electron is perceived to have a uniform electrical activity

While it would be suitable to designate that the subsidiaries have a bearing upon the focus; the use of "↬" in this instance emphasizes that the experimenter is carried away by the subsidiaries into the focus. In effect, the experimenter retains only a subsidiary awareness of metal plates, oil drops, microscopes, etc., while he is perceiving the electronic activity which they serve to reveal. Anyone who lacks the "faith" of the scientist would find his attention fixed only upon

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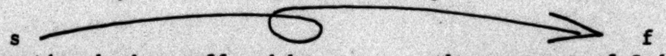
the curious oil drops which move within the field of the microscope and nothing more.

The Christian is similarly situated in reference to the clues he employs to discover God. The star-filled sky and the sacred ritual have intrinsic interest and suffice to attract and retain his focal attention. In so doing, however, God is absent. Only when the suitable clues serve to carry his attention away into the perception of the hidden Reality therein does the divine presence become manifest.



s	f
incarnational clues offered by dwelling within a suitable ritual, a star-filled sky, etc.	the presence of God is perceived (e.g. as creating, forgiving, calling, empowering, etc.)

(C) Perceiving God is neither wholly a production of God nor is it wholly a production of man. The notion of indwelling (with respect to man) and the notion of presence (with respect to God) effectively supersedes the either/or dualism. God's very presence in the world--his self-giving--offers man the clues to his presence. Man's dwelling in the world--his self-giving and sense-giving--allows him to skillfully integrate those clues and thereby assimilate the meaning of God-within-the-world.

Schleiermacher and his disciples endeavored to secure the reliability of the Christian's awareness of God by specifying that the knowing organism is totally passive[1] and can therefore contribute nothing to the experience of God. On the other hand some philosophers and psychologists have endeavored to discredit the perception of God by reducing it to a self-induced activity. The Christian is aware that he does indeed skillfully create his rituals and credal formulations; but he does so only under the impulse of having already encountered a specific living Reality[1] which he knows that he can only hope to correctly evoke in those who are rightly carried away by surrendering themselves to the symbols he selects. Thus rituals and credal formulations are never themselves confused with faith nor its object which is God. Their function is totally specified by their service in adequately evoking the particular God which dominates the experience of the originative genius. From this perspective, Christian rituals and credal formulations can be understood as serving to evoke and perpetuate (both in time and in place) the private, transitory discovery of God achieved by Jesus and his disciples. The intent of such a designation will be spelled out in the following theses. Suffice it to say, for the moment, that those who create rituals and credal formulations do at all times feel constrained by the very perception of God which they intend to evoke. It is no different for the compositions of Mozart or the equations of Einstein. Mozart would say that he himself created his compositions but that there was no arbitrariness whatsoever in their composition--he had to do them as he did for them to be right (and he cannot tell exactly what rightness means). Einstein, like Copernicus

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[1] Contemporary studies now indicate that even the seeming passive operation of seeing is indeed a highly sophisticated activity which once acquired operates with nearly effortless precision. Experiments with prismatic glasses which invert the field of vision have shown that the subject enters a stage of confused disorientation but that after the expenditure of enormous efforts he again finds himself capable of skilled performances because he has reintegrated his visual stimulii in such a way that he again perceives everything "normally" even while his glasses continue to invert the visual field entering his eyes. Needless to say, the removal of the glasses sends him back into another stage of disorien-

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tation because his newly acquired integrative skills now betray him. Polanyi uses this and allied studies to mediate between those who would opt for either an overemphasis on activity or an overemphasis upon passivity in the act of perception. Cf. TD, 4-20.

[1] The force of this assertion will be spelled out in the following thesis.

before him, made use of mathematics and expressed therein the truth of a reality which he perceived long before he or anyone else ever made any experiments. Experimental testing only takes place when the scientist is already perceiving in his mind's eye the reality which he knows that he will find. Every designed experiment (ritual or musical composition) which failed to "capture" the reality for which it is designed need not cast any doubt regarding the reality itself but only shows up the inadequacy of that experimental (ritual or musical) design. As a consequence of this parallelism, it should be just as easy to suspect that Millikan's oil-drop experiment creates the electron which it intends to manifest as it is to suspect that classical Christian rituals create the God which they intended to manifest within their cultural climate. If classical rituals and credal formulations are opaque and lifeless, it need not signify that God was man's creation but rather that man's creations are no longer effective vehicles for evoking an adequate perception of God for modern man.

Thesis III. Revelation[1] refers to every act of discovery wherein the faith of an inquirer is enlarged by being carried away by a new set of clues so as to perceive his God therein. Revelation[2] may either be dependent or primary. Dependent revelation refers to those guided acts of discovery wherein the Christian apprentice moves through those progressive feats of integration whereby he assimilates the faith of his teachers (who represent the Christian tradition). Primary revelation refers to those novel acts of discovery wherein the mature Christian is passionately carried away into perceiving the living God in a manner not explicitly embraced by his believing community. In both contexts revelation entails a passionate self-giving to a normative manifestation of God: the apprentice submits to the classical instances of revelation which are normative in his formation; the mature Christian submits to his present encounter with the living God whom he discovers as personally normative (on the same grounds that the past instances of revelation were normative for their recipients).

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[1] The term "revelation" does not appear within Polanyi's philosophy. Yet, insofar as the "act of discovery" represents for Polanyi the process whereby a novel reality is perceived and accredited, the present author judged that the process which the Christian community terms "revelation" can and ought to be intelligible as a special instace of the generalized process of discovery.

[2] The division of revelation into "dependent" and "primary" has been suggested by the writings of Paul Tillich and John Macquarrie. The contents of these terms, however, is rigorously specified within Polanyi's epistemology. More especially, Polanyi does use the act of discovery for illuminating (a) the process whereby a student discovers what his teachers already know and (b) the process whereby a genius is led to disclose a novel manifestation of the reality which he is investigating. These processes are specified as "dependent revelation" and "primary revelation" within the present author's choice of Christian terminology.

(A) Revelation (in its dependent context) refers to every act of discovery wherein the apprentice progressively assimilates the faith of his teachers. The Christian initiation (or catechesis) can now be specified as a guided series of discoveries. Why it is necessary[1] to speak of discovery in the learning process follows from our previous understanding of the unspecifiability of both the act of faith and the clues to which it attends. More specifically, no teacher can directly communicate his faith performance; nor can he exhaustively specify those clues which he holds in subsidiary awareness during his performance. This being the case, the apprentice is restricted to reverently contemplating and imitating his master. Thus a child learns to pray by progressively entering into and imitating the gestures and words presented by his parents.

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[1] SFS, 44; PK, 124ff, 172; SM, 57.

The apprentice in every other domain of culture is similarly situated. For example, novices at chess must attentively rehearse the more and more complex strategies of the masters if they ever hope to assimilare progressively the skills which undergird their strategies. The apprentice, therefore, at each stage of his development possesses limited organismic skills; he is continually prodded on to stretch his capabilities by assimilating the ever-more-sophisticated sets of clues offered by his masters. Frequently he is frustrated by incorrect responses or he is puzzled by formulations which are as yet meaningless for him. In the end, however, the apprentice so informs his faith that the full meaning intended by his masters is embraced and claimed as his own.

(B) Revelation (in its primary context) refers to every act of discovery wherein the mature Christian is passionately carried away into perceiving a novel manifestation of the living God.

By his apprenticeship, the Christian acquires the skill to perceive God rightly. Having acquired this skill, however, he enters into a heuristic circle which operates as a stable framework of modes of feeling and perception which effectively militates against novel experiences of God.[1] Thus faith habitually manipulates experience such that the Christian is predisposed to discover therein those self-satisfying patterns of reality for which his organism has been trained.

Within this perspective, the process of Christian initiation sometimes falls under the suspicion that it merely exists as a form of indoctrination which enforces duplication and extols banal repetition.

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[1] PK, 197, 288ff, 322-24.

This overlooks the fact, however, that the Christian is trained to perceive a living reality which manifests itself in an indeterminate set of future manifestations.[1] As a consequence of his training, the apprentice takes his stand within the tradition of his masters and endeavors to rival their performances. In so doing he opens himself to discover novel manifestations of that reality to which his tradition is attentive and take responsibility for sharing his discovery with his confreres. Even within this process, he recognizes that the present skills of his profession only serve as the necessary backdrop which he, the discoverer, must attempt to stretch by encouraging his sympathetic hearers to discover after him. As a consequence, the creative acts of discovery and, more especially, the daring acts of genius stand as the creative manifestations of reality which may serve to extend the faith of an entire community. Since this process of renewal relies upon the individual growth of every member of the community, it may require some time before momentous new discoveries are the fabric of everyday faith for its members. In the case where discoveries disrupt the traditional faith deeply, bitter controversies can occur in which representatives of the same tradition are passionately out to convert their opponents. Many years may pass before a new consensus does again emerge in the faith stance of such divided communities. This process of renewal through novel manifestations of the divine reality constitutes the perennial basis for the renewal of religious traditions.

When creativity has been ignored or stifled by coercive controls,

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[1] SFS, 10; PK, 116-17; TD, 32.

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Christian communities have been known to sanction demonic errors and to prop up meaningless rituals by the sheer force of authoritative appeals. This does not mean that creativity is an unambiguous gift, however. The charlatan and the genius alike make claims to novel revelations. Even the mature Christian is exposed to delusions, and the Christian Saints were strong advocates of discernment.

What must be emphasized at this time, however, is the openness with which the Christian ought to be trained so as to discern the voice of the living God: "If he should call to you today, do not harden your hearts." Such novel manifestations of God require a breaking out[1] of the habitual modes of satisfaction. The integration of a new set of clues demands a new integrative skill (which is biblically designated as a change of heart or metanoia). In a moment it will be shown that only the process of discovery can account adequately for the conversion wherein the discoverer transmutes his communally-formed faith so as to attach himself with resolute passion to an enlarged mode of perceiving God. The discoverer generally attempts to enrich the participants of his community by also leading them to the selfsame discovery in which he has been grasped by the living God. For doing this, he can make no effective appeal to the traditional faith for his stance; in fact, the instinctual passions of his tradition often provoke violent resistance to the authentic revelations of religious genius. Thus the treatment accorded to Isaiah, Jeremiah, Jesus, and St. Paul offer classical instances of the passionate conservativism of religious faith in the face of God's novel self-manifestations. The creativity of religious genius would be impossible without the intellectual passions which allow a man to let go the secure raft of authenticated tradition in order to stake his reputation, his career, his life upon an innovation which has not stood the test of time. The following citations indicate the depth and risk of the "conversion experience" which creates a sort of heuristic gap between the discoverer and his former religious intimates:

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[1] PK, 197-98.

> To the extent to which a discoverer has committed himself to a new vision of reality, he has separated himself from others who still think on the old lines. His persuasive passion spurs him now to cross the gap by converting everybody to his way of seeing things, even as his heuristic passion has spurred him to cross the heuristic gap which separated him from discovery . . . .
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> . . . .
>
> Formal operations relying on one framework of interpretation cannot demonstrate a proposition to persons who rely on another framework . . . . Proponents of a new system can convince their audience only by first winning their intellectual sympathy for a doctrine they have not yet grasped. Those who listen sympathetically will discover for themselves what they would otherwise never have understood. Such a process is a heuristic process, a self-modifying act, and to this extent a conversion. It produces disciples forming a school, the members of which are separated for the time being by a logical gap from those outside it. They think differently, speak a different language, live in a different world, and at least one of the two schools is excluded to this extent for the time being (whether rightly or wrongly) from the community . . . .[1]

(C) The Sacred Scriptures preserve the memory of the classical instances of revelation. As such they are not to be thought of as the exhaustive descriptions of revelation; rather, they are the creative works of genius accredited by a community[2] attempting to codify (or canonize) certain sets of clues as the normative instances of its past revelation. The classics in art and music as well as the classical experiments in science function in a parallel fashion. The classics serve as the examplars of the best performances that the tradition has produced. Being the products of creative inspiration combined with skilled execution, the classics serve as the normative exemplars[1] which are calculated to evoke and impose correct modes of feeling perception upon the widely dispersed (in time and place) adherents of that tradition. Every apprentice is required to reverently contemplate and faithfully reproduce the classics for himself. His judgment is thereby informed. Thus the student of physics repeats the momentous experiments of Cavendish, Millikan, and Young so as to assimilate their perceptions and performances which are normative in his development. The apprentice to Christianity is similarly placed with regard to the New Testament, classical rituals, and credal formulations. Each is normative in his Christian formation.

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[1] PK, 150-51. This citation applies specifically to scientific discoveries but, as can be readily seen, it applies with equal force to the Hebraic-Christian traditions.

[2] PK, 163.

The New Testament is especially important since it represents the earliest extant attempts to specify the faith performance of primitive Christianity. The inspiration of the sacred writers refers to their skill of adequately and aesthetically setting down the verbal clues which inscripturalizes the faith of their community. The Sacred Scriptures do not contain revelation (in the sense used herein), but are suitable clues for directing the inquirer toward a revelatory discovery. As such, the human words of the bible are heard such that the Word (meaning) of God hidden in them sounds through. There is nothing arbitrary about the words of the bible, but they are not to be construed as dropped down from Heaven or as concealing divine truths. The bible can help reveal God rightly to those who know how to read it. It is intended to reveal and not conceal.

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[1] Within Polanyi's perspective neither revelation, nor the faith to which it gives rise, can be exhaustively specified. Thus the Old and New Testaments must be understood as those sets of clues which demand a correct faith in order to comprehend them. As such, therefore, the Sacred Scriptures are normative only within a community which has the shared skill of integrating the Scriptural clues rightly. Cf. PK, 163, 203, 219.

Modern man is separated by a cultural chasm from the milieu in which the Scriptural writers lived. Scientific exegesis is important for reconstructing the original meaning intended by the authors. Yet, no Christian today ought to believe that his faith depends primarily upon the scholarly reconstruction of the primitive beliefs. On the contrary, no modern man can possibly deny two thousand years of cultural development so as to reproduce in himself the culturally-conditioned faith of primitive Christianity. It is lamentable that some men use the Scriptures as the definitive classic. It would be just as lamentable for a musician to so exalt Mozart that he ignored any music written after him (e.g. Stravinski, Bartok). The Scriptures are not normative as the last words on Christianity but as the best first words.

(D) The passionate act of discovery forms the paradigmatic case for all religious knowing. It shows how the question of God can be asked even before his reality is experienced. It accounts for the reliability with which the inquirer recognizes God once He is found even though he has never seen Him before. It accounts for the tenacity with which both classical and novel perceptions of God are held by adherents of the same Christian tradition. While the act of discovery cannot be fully specified due to its subsidiary function within the focal anticipation of a novel reality about to emerge, it can nevertheless be illustrated so as to enable its recognition and appreciation. Polanyi develops the ontology of discovery in the following terms:

> The pursuit of discovery is conducted from the start in these terms; all the time we are guided by sensing the presence of a hidden reality toward which our clues are pointing; and the discovery which terminates and satisfies this pursuit is still sustained by the same vision. It claims to have made contact with reality: a reality which, being real, may yet reveal itself to future eyes in an indefinite range of unexpected manifestations.[1]

In this perspective every novel revelation of God and every novel scientific discovery proceed in parallel terms:[2] (1) a man is gripped by a compelling sense to search for an-as-yet-indeterminate-reality of which he is only tacitly aware, (2) he commits his personal powers under the lure of his tacit intuitions to grope towards that reality, (3) he passionately recognizes the sought-for-reality and (4) takes responsibility for skillfully arranging those clues which he now knows can lead his sympathizers to the same discovery.

Applying this now to the novel revelation of God, we might expect something like the following: (1) Initially, the Christian experiences an indefinable uneasiness, discontent, or hollowness within the status quo. He may be able to identify no discernible limitation in the God he currently perceives or find any specifiable irregularity in his relationship with God.[1] Yet, more and more he feels seized by an-as-yet-indeterminate-call of which he is only tacitly aware. This tacit awareness is a non-deliberate process[2] which is held only in subsidiary awareness. Clinical psychology knows this tacit anticipation as subception.[3] (2) There follows a more-or-less deliberate stage in which the Christian roughly gauges "whether the importance of a possible discovery would warrant the investment of the powers and resources needed for its pursuit."[4] This assessment combines both rational and imaginative components which are felt together primarily in terms of the emotional lure which the anticipated discovery has upon him. Obviously this discernment is necessary otherwise the Christian would constantly be spending his energies on wild goose chases. Mature Christians are characterized by their right sense of where and how to deploy their energies.

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[1] TD, 24.

[2] This arrangement follows roughly the divisions found in PK, 120-131, 159.

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[1] The dictum, "a thousand difficulties never make a doubt," finds full application here. By themselves difficulties cannot disrupt the particular tacit skills of the believer, only difficulties combined with vague intuitions of a truer understanding of God can lead the Christian toward religious doubt. A parallel situation exists in the face of scientific difficulties which a scientist cannot reconcile with the traditional theories (seen as belief statements) held by his community. False experimental predictions are classified as anomalies which limit the scope of a theory without casting its essential soundness into doubt. "A belief always works in the eyes of a believer." Cf. Polanyi's chapter on "Authority and Conscience" in SFS, 42ff and "The Critique of Doubt" in PK, 269ff for his well-ordered analysis of both scientific and religious doubting. Polanyi's position here is largely shared by Thomas Kuhn, The Structure of Scientific Revolutions (2nd ed. Chicago: The University of Chicago Press, 1971).

[2] Polanyi, "The Creative Imagination," Chemical and Engineering News, 44 (April 25, 1966), 91.

[3] TD, 8.

[4] Polanyi, "The Creative Imagination," op. cit., p. 89.

Once a specific lure is accepted, personal powers are released in response to the tacit intuitions which are relied upon to sense those directions of greater coherence. Random readings, chance meetings with strangers, prayerful reflections: every event can provide valuable clues to the novel perception of God which is luring the Christian on. Those which are important are retained and returned to later in quiet moments in which their assimilation can be continued;[1] unimportant clues are either overlooked or rapidly forgotten. What emerges as important and what is retained in subsidiary awareness are those particulars which are felt of importance for closing the heuristic gap which looms between the God-who-is-for-us-now and the God-who-is-coming-to-us-but-not-yet-arrived. Seen in this light the whole liturgical season of Advent might well be thought of as an anticipation of the lifelong religious conversion to which each Christian is invited.

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[1] Polanyi strongly emphasizes that the intuition operates here as the subliminal guide in the valuation of clues. The involuntary and subsidiary operation of the intuitive discovery which occur in dreams. Numerous self-revelations of God in the Old and New Testaments are depicted within the context of dreaming states. Cf., e.g., John A. Sanford, God's Forgotten Language (Philadelphia: J. B. Lippincott Company, 1968); Mortant Kelsey, Dreams: the Dark Speech of the Spirit (Garden City: Doubleday and Company, o968); or Victor White, God and the Unconscious (New York: World Publishing Company, 1960). That dreaming states figure large in some scientific discoveries, cf. Stanley Krippner and William Hughes, "Genius at ZZZ Work ZZZZZZZ," Psychology Today, 3, 13 (June, 1970), 40-42.

(3) After a sustained period of groping, the God-who-is bursts in upon the awareness of the searching Christian. Within a passionately satisfying recognition which leaves no doubt that this is indeed He-who-was-anticipated-from-afar the Christian finally integrates into a single whole an expanded perception of the living God.

The moment of discovery is of paramount interest. The discoverer is finally fully carried away into perceiving his God within a new set of clues. His faith performance is transmuted: a new integrative skill is established. Most significantly, however, the discoverer is passionately certain of the novel manifestation of God which he at last perceives. It is like the moment that someone recollects a word or a name which "is just on the tip of his tongue." The straining anticipation erupts into a satisfying enjoyment. Thus, a novel awareness of God arrives accredited in advance by the heuristic craving that evoked it.[1] Ultimately the discoverer might be deluded: but, for the moment, he is unable to suspend the passionate satisfaction of his new awareness of God.

In the end, therefore, Polanyi returns to the higher grade of personal satisfaction[2] which the discoverer finds in his new appreciation of God as the basis of his affirmation and commitment. In this perspective, the discoverer's faith is an intellectual passion, both self-moving and self-satisfying. This escapes subjectivism in so far as the initial faith of the inquirer is tediously shaped by his community. The discoverer's transmuted faith, after his personal revelation, also escapes subjectivism in so far as the discoverer feels himself called out and addressed by the living God to which his whole tradition has trained him to be responsive. He necessarily holds his novel manifestation as a direct consequence of those very spiritual resources[1] which his religious community has shared with him. He, furthermore, expects that he will be able to share his discovery with anyone who shares his preparatory Christian faith.

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[1] PK, 130.

[2] The passionate accreditation of every discoverer leads Polanyi to reject many popular schemes for explaining the growth of a tradition. Polanyi rejects those who would appeal to some form of logical inference or rules of discovery [PK, 149-50, 166, 257-61; SFS, 25-28, 76] to explain the fruitfulness of a traditional faith. Logical inference and rules of discovery are, at best, elliptical formulations; to accept them is possible only for those who have already experienced the reality to which they lead. Polanyi also rejects any scheme based upon a random generation of new ideas followed by pragmatic testing. [PK, 147, 174ff, 183] Random ideas can only lead to chaos. The pursuit of discovery is always guided by sensing the relevance of every novel clue based upon the personal intuition of the inquirer. Furthermore, the inquirer only tests pragmatically what he already senses to be true. No inquirer could test everything.

(4) Thus, following the moment of discovery, the Christian is enabled to perceive the living God in a new mode. If his revelation has a significance for all or part of the Christian community, he takes responsibility[2] for skillfully arranging those clues he already knows so as to enable others to share his discovery. In this fashion prophets are born. John XXIII, Bishop Pike, John L. McKenzie, Martin

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[1] SFS, 78-79; SM, 60-61.

[2] The persuasive functions of the intellectual passions follow directly upon the heuristic functions. Once the heuristic functions have sustained a Christian in his inquiry to that point where he himself is converted from the status quo to a new vision of God's reality, his intellectual passions are largely converted into persuasive functions which set out to enrich the world. Despite idealistic rhetoric, no flesh and blood Christian is nonchalantly relativistic when he presents what he has discovered. Quite to the contrary, every prophetic Christian believes that his search has led him to a position superior to the one he abandoned and therefore quite capable of eventually attracting and converting all of his fellow Christians provided they are suitably disposed.

Luther King, Daniel Berrigan, and Ralph Martin represent a few of the distinguishable prophets within the Christian communities of our day. Time will tell which of these prophetic revelations will convert the masses such that their transmuted faith will become part and parcel of the ongoing Christian tradition. The passing down of a tradition is thereby open to disruptions and transmutations at every step of the way as individuals and groups remain open to the living God.

Thesis IV: Both the Hebraic Scriptures and the contemporary theories of cosmogenesis provide suitable sets of clues whereby God is evoked as The Creator. God's creative initiative with respect to this world can be designated as beneficently directed toward the emergence of higher orders of achievement. This initiative is effected, not by a miraculous replacement, but by a boundary control which enables a higher operating principle to harness the energies of lower operating principles without impairing their proper autonomy.

Within this perspective, the reality of God is immanent (and available for human discovery) in our world through the boundary control which He exerts within the world-wide creative emergence. As such, the phenomena of revelation cannot be restricted exclusively to any particulaw event or particular community since God's initiative has a universal character. In addition, the reality of God is transcendent (and concealed against human discovery) with respect to the world insofar as his initiative in the world is open to an indeterminate range of future manifestations. As such, the phenomena of revelation cannot be exhausted in any particular, finite series of past discoveries, and the personhood of God must be sought within an as-yet-undisclosed set of future events.

XUM

(A) The God of the Hebraic-Christian tradition is He-who-creates.

Israel perceived itself to be the creation of Yahweh:[1] with the Exodus event the Hebrew slaves perceived that the household God of Abraham, Isaac, and Jacob was initiating the formation of a free people destined to become a prosperous nation in a land they would conquer. In Egypt, Moses discerned this new initiative of Yahweh and pledged his cooperation. Moses was blessed. Meanwhile, Pharaoh persisted in saying, "Who is Yahweh that I should listen to him?"[2] Pharaoh was cursed. Even his court magicians affirmed the curses as the finger of God;[3] and the Egyptian soldiers cried out in distress, "Yahweh is fighting for them."[4] Thus obedience to God's novel initiatives in history is set as the abundant cause of all blessings; while the failure to discern God's initiative or the unwillingness to harness one's personal energies in response to His initiative is the cause of the multiple curses which erode man's well-being.

Witness Moses' encouragement to the sons of Israel at Kadesh:

> Do not take fright, do not be afraid of them [the Amorites]. Yahweh your God goes in front of you and will be fighting on your side as you saw Him fight for you in Egypt.[5]

Yet, the people lost heart in face of the might of the Amorites, and Yahweh cursed them saying that none of them (Moses included) would set foot upon the promised land. At the same time, Yahweh blessed Caleb and his descendants "for he has followed Yahweh in all things."[6] It was

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[1] Exodus 20:2; Deuteronomy 5:6, 6:12, 8:14, 13:10.

[2] Exodus 5:2.

[3] _Ibid._, 8:15.

[4] _Ibid._, 14:26.

[5] Deuteronomy 1:29.

[6] _Ibid._, 1:36.

Caleb who opposed the people saying, "We must march in and conquer the land: we are well able to do it."[1] Later the people regained courage for an attack but Moses discerned Yahweh to now be saying, "I am not among you."[2] They attacked anyway and were sorely driven back.

Or again, witness the blessings and curses attached to the Law which Moses discerned as the necessary response of the people to Yahweh's initiatives in their regard:

> . . . If you keep the commandments of Yahweh your God and follow his ways: All the peoples of the earth will see that you bear the name of Yahweh and will go in fear of you. Yahweh will give you great store of good things, the fruit of your body, the fruit of your cattle and the produce of your soil, in the land he swore to your fathers he would give you. Yahweh will open the heavens to you, his rich treasure house, to give you seasonable rain for your land and to bless all the work of your hands. You will make many nations your subjects, yet you will be subject to none . . . .
>
> But if you do not obey the voice of Yahweh your God nor keep and observe all those commandments and statutes of his that I enjoin on you today, then all the curses that follow shall come up with you and overtake you. . . . Accursed will be your pannier and your bread bin. Accursed will be the fruit of your body, the produce of your soil, the increase of your cattle, the young of your flock. . . . Yahweh will strike you down with consumption, fever, inflammation, burning fever, drought, blight, mildew, and these will pursue you to your ruin. The heavens above you will be brass, the earth beneath you iron. Yahweh will turn the rain on your land to dust and sand; it will fall on you from the heavens until you perish. Yahweh will have you defeated in front of your enemies; you will come at them by one way and flee before them by seven; and you will become a thing of horror for all the kingdoms of the earth.[3]

The whole of the history of Hebrew people can be summed up as their ability or inability to discern and respond to Yahweh's historical initiatives. The prophets, more especially, are those who claim to have discovered God's initiative; they claim to have discerned the meaning of the events surrounding the Hebrew people. For example, Jeremiah experiences himself as moved to speak to the people in Yahweh's name thusly:

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[1] Numbers 13:30.

[2] Deuteronomy 1:43.

[3] _Ibid._, 28:9-26.

> You have polluted the country with your prostitution (to other gods with their own particular initiatives) and your vices; this is why the showers have been withheld, the late rains have not come.[1]

Jeremiah perceives Yahweh as the only active initiator in the cosmos:

> Tell them this, "The gods who did not make the heavens and the earth, will vanish from the earth and from under the heavens.
>
> By His power He made the earth,
> by His wisdom set the world firm,
> by His discernment spread out the heavens.
> When He thunders
> there is a tumult of water in the heavens;
> He raises clouds from the boundaries of earth,
> makes the lightning flash for the downpour,
> and brings the wind from His storehouse.
> At this all men stand stupefied, uncomprehending,
> every goldsmith blushes for the idol He has made,
> since His images are nothing but delusion,
> with no breath in them.
> They are a Nothing, a laughable production;
> when the time comes for them to be punished, they will
> vanish.
> 'The Portion of Jacob' is not like these,
> for He is the maker of everything,
> and Israel is the tribe that is His heritage.
> His name is Yahweh Sabaoth.[2]

Yet, Jeremiah is persecuted[3] by his countrymen for his interpretation of events. He likens himself to "a trustful lamb being led to the slaughter house."[4]

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[1] Jeremiah 3:3.

[2] Ibid., 10:11-16.

[3] Cf. Jeremiah 11:18 ff. and 18:18 ff.

[4] Ibid., 11:19.

Into this arena, Jesus came proclaiming the new inbreaking of God's initiative. Acting in harmony with this initiative, demonic hinderances were driven out and trusting individuals received good news, liberty, new sight[1]--the Lord's blessings. Jesus invited men to transform their perspectives, to let go of their blighted religious traditions, to unfreeze themselves for the sake of the new tomorrow--all for the sake of the Kingdom of God which is close at hand.[2] "Nobody puts new wine into old wineskins."[3] Yet the religious establishment opposed him as anti-religious, demonically possessed, or as a wine-drinker and a glutton.[4] His disciples acted in fidelity to the discovery of their master. They too were persecuted as "using blasphemous language against Moses and against God."[5] Yet they persisted and "day by day the Lord added to their community those destined to be saved."[6]

The disciples of Jesus also continued to be open to God's initiatives in the way which Jesus taught them. Peter, for example, was criticized by his fellow community members for visiting the uncircumcized and eating with them. However, Peter related how God had poured his Spirit Cornelius and his household following upon a dream with prompted him to discern all meats as clean.[7]

And so it has been up to the present time. The various communities

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[1] Lk 4:18.

[2] Mk 1:18.

[3] Mk 2:22.

[4] Mk 3:22 and par.; John 9:16; Mk. 2:7; 2:16; 2:18; 2:24; 7:5; 8:11; 11:28 and par.; Matthew 11:19; Lk 7:34.

[5] Acts 6:11.

[6] _Ibid._, 2:47.

[7] _Ibid._, 10 and 11.

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of Jews and Christians have continued to rely upon their discernment of God's initiative within the dynamics of their respective histories as the creator of their well-being.

(B) While the Old and New Testaments witness to the decisive historical initiatives of God within their personal-collective development, it can now be suggested that contemporary descriptive cosmogenesis is also admirably suited to provide the clues whereby the Christian might perceive God's creative initiative within the whole history of our cosmic development. Such a descriptive cosmogenesis cannot and will not be here offered as a scientific argument[1] for the existence of the Christian God. Rather, cosmogenesis will be examined here insofar as it provides an account of the clues whereby the inquirer might be carried away into discovering a transcendent power which calls forth his reverent response. Needless to say, the Christian will be anxious to call such a transcendent power God for he will be prompted by his religious faith to identify the cosmic creator as the One-Who-formed-Israel and the One-Who-fashioned-Jesus. The a-religious inquirer, however, will not make such an identification for he lacks an appropriate apprenticeship in the Hebraic-Christian tradition. The descriptive cosmogenesis which follows, therefore, is primarily intended for the Christian. It is offered in the hope that the Hebraic creation myths will be discovered as the archaic forerunners of our contemporary evolutionary theories. It is offered in the hope that contemporary descriptive cosmogenesis might provide Christians with a certain reality therapy[1] whereby they might more securely discern the initiative of God wherever and whenever it is found. We begin therefore with a brief account of the clues provided by descriptive cosmogenesis followed by an analysis according to the mind of Michael Polanyi:

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[1] As will be suspected from the foregoing, every argument can only consist in an artistic arrangement of clues designed to be integrated in a precise fashion. The person designing the argument is immediately carried away into the meaning of his clues by virtue of the tacit skills he already possesses. However, the person without such skills finds himself perplexed by the clues themselves. He does not perceive what the clues intend and, therefore, cannot approve of the argument. Only if he would sympathetically enter into the clues might he be actually carried away into discovering what it is that the author of the clues intends. In such a case, the description given above for dependent revelation would apply.

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[1] Needless to say, many Christians are perfectly able to grant that God did manifest himself in the past as attested to by the Scriptures. In addition, these same Christians may hope for God's initiative in their future (e.g. after death or at the end of the world); yet, they do not perceive any initiative of God whatsoever in the present world dynamics. In view of this, I quite agree with Edward Schillebeeckx, O.P., who represents the Death of God theologians as calling for an honest reappraisal of our traditional God-talk in the following terms:

> The Christian revelation, in the form in which it has been handed down to us, clearly no longer provides any valid answer to the questions about God asked by the majority of people today, and it would also appear not to make any material contribution to modern man's meaningful understanding of himself in this world and in human history . . . . The situation requires us to speak about God in a way that is *different* from our past speaking about God. If we do not do this, we shall perhaps still be able to experience God *ourselves* in obsolete forms, but our own witness of the speaking about God will clearly be greeted by most people with head-shaking disbelief as incomprehensible mumbo-jumbo (Schillebeeckx, "Theology of Renewal Talks About God," *Renewal of Religious Thought*: Proceedings of the Congress of the Theology of the Renewal of the Church Centenary of Canada, 1867-1967, ed. by L. K. Shook, C.S.B. [New York: Herder and Herder, 1968], pp. 83-84.)

Thomas J. J. Altizer earlier expressed the same alarm within Protestant circles in parallel terms:

> Few Protestants are aware of how much of our inherited Christian faith and witness has its source in an increasingly archaic ecclesiastical tradition, and even fewer theologians are willing to negate all those ecclesiastical norms and traditions which are incompatible with the contemporary life of faith. But there lies no way to a contemporary epiphany of Christ apart from a consistent and thoroughgoing transformation of the language and forms of all ecclesiastical Christianity [Altizer, *The Gospel of Christian Atheism* (Philadelphia: Westminster Press, 1966), pp. 9-10].

That non-Christian religions are also victims of a cultural gap can be seen from the *Proceedings of the Eleventh International Congress of the International Association for the History of Religions: The Impact of Modern Cultures on Traditional Religions*, vol. I (Leiden: E.J.Brill, 1968).

Scattered elementary cosmic building blocks (subatomic particles) are drawn together under the influence of universal gravitation (a weak, long-range force) until the size, pressure, and temperature buildup form a star (like our sun, e.g.). Within a star, subatomic particles fuse together under the influence of strong, very-short-range nuclear forces forming progressively larger and larger atoms until they become so large so as to be unstable and susceptible to breakdown (i.e., nuclear fission). Sometimes enormous eruptions in stars cause fragmentation. Some ejected fragments might be modified by mutual gravitation in their direction and speed so as to meet the stringent requirements for orbiting the star. These select few would "flow" into a spherical shape and slowly cool down providing the necessary conditions for the survival of the larger atoms. With progressive cooling, the medium-strength, short range forces (Van der Walls forces and chemical-bonding forces) between atoms allows the formation of stable compounds (i.e., molecules or chemically-bonded atoms), and the formation of solids and liquids.

On the planet Earth, rotation, cooling, and erosion provided for the mixing of the surface minerals under various degrees of temperature, pressure, sunlight, and cosmic bombardment such that an enormous variety of molecular combinations were "tried"--stable molecules grouped themselves together due to the selectivity of crystallization and condensation; unstable molecules broke down into their former smaller molecules or atoms. Like a world-wide laboratory of chemical experimentation in progress, each new successful molecule provides the raw material for the synthesis of a yet-larger molecule. With enormous time for diversification and testing, some environments allowed for the formation of molecules involving the chemical combination of hundreds, then thousands, then hundreds of thousands of atoms--the macro-molecules were born. Among them, those that had the shape of a particular double helix were particularly successful: these macro-molecules had a mechanism whereby they attracted and assembled macro-molecules like unto themselves (molecular "reproduction"). These "living" macro-molecules (all with the characteristic double helix) multiplied whenever they found themselves surrounded by a liquid containing the necessary molecules for their "nourishment."

Particularly successful was the bundle of "living" macromolecules which found itself provided with a constant liquid nourishment enclosed in a tiny, thin-walled chamber--a single-celled organism was born. Under the influence of forces as yet little understood, some cells divided and multiplied and formed groups of cells wherein some cells took on specialized functions thereby establishing ties of dependency--the multi-cellular organism. More sophisticated reproductive mechanisms evolved. Most often organisms inherited faithfully the characteristics of their parents; sometimes mutations resulted. Most mutations had a decreased survival value and died out; others however intro-

> duced valuable new characteristics which they passed on to their offspring. With enormous time for diversification and testing, some environments allowed for the formation and survival of multi-cellular organisms involving thousands or hundreds of thousands of cells, each with its individualized function in the complex team effort and interdependence. Among these, three styles were particularly successful: that of plants, insects, and vertibrates. Furthermore, it was among the vertibrates that the greatest complexification occurred. Finally a species was evolved that had high survival value within every ecological zone on Earth--this vertibrate was homo sapiens.
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> Man's erect posture frees his dexterous hands for the fabrication and utilization of tools. Man's superior nervous system presents a rich experience of his environment which his efficient memory retains for quick recall and future guidance. Man's richness in acting and experiencing finds facile expression in the rich variety of noises of which his highly trainable tongue and larynx made him capable. Drawn together into tribes by mutual attraction, man quickly accommodates himself to the expression and imitation and repetition of a highly sophisticated and standardized pattern of noises embodied in language formation. Language provides stimulation for man: it preserves the best in man's past experiences and allows him to share articulately his present experiences.
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> Creative experimentation and testing can now proceed at a fantastic rate since now the successes are not passed only to a single biological offspring, but they are immediately presented to the entire human community for implementation by all. The language code surpasses and completes the genetic code. Animals do learn from their experience and are taught successful modes of acting by their parents. This cultural tradition, however, is gained so slowly and crudely that it scarcely has any net cumulative gain. For man, on the contrary, language allows the rapid and articulate transmission of the successful cultural tradition such that a preponderance of time and energy remain for creative inventiveness. Every creative thought and action in man is a veritable mutation.[1] Man easily remembers, repeats, and communicates his successful mutations. With the increased concentration of men, socialization proceeds with ever increasing effectiveness. Increased specialization lends itself to increased craftsmanship and increased interdependence. In mankind the very movement of cosmogenesis is discernible: everything else in the universe appears static in comparison.

What emerges from this descriptive cosmogenesis is the recognition that the evolving cosmic order exhibits successive orders of reality specifiable by irreducible operating principles and standards of excellence.

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[1] Polanyi finds significant parallels between organismic and cultural evolution. In each case a novel emergent is tacitly and vaguely discerned in advance to its full maturation as an inherited trait of a community of individuals. Cf. PK, 400, 402-406; TD, 45, 87-89.

One possible listing of the successive orders of reality might be the following:

nuclear processes
physical and chemical processes (inter-atomic)
atomic processes
cellular processes
neuro-muscular processes
responsible human processes

The most decisive emergent within a long history of phylogenesis is the responsible personhood of man. Thus each man feels himself subject to moral obligations which he has freely undertaken. Polanyi takes great pains to correct both those who attempt to reduce man's responsible choices to lower orders of operation and those who so exalt man's responsibility that they ignore its organismic limitations. Behavioristic psychology and scientific physiology[1] fall within the first error; the various forms of body/soul dualisms fall within the second. By insisting that the operating principles at each level of reality are irreducible to lower order processes, Polanyi wishes to avoid any form of reductionism.[2] On the other hand, by insisting that higher order operating principles do not appear at lower order of reality, Polanyi wishes to avoid any form of psychism.[1] How various distinct levels of reality can be maintained wherein higher orders of reality penetrate lower orders without interfering with their distinctive operation relies upon Polanyi's understanding of boundary control.

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[1] Cf. PK, 372ff; TD, 42ff; SM, 52ff. Polanyi even criticizes the creative behaviorism of E. C. Toulman and the logical behaviorism of Gilbert Ryle. Cf. PK, 372.

[2] Reductionism suffers due to misplaced extrapolation. Its success in many quarters is partially due to the bold advances that have been made within bio-physics and bio-chemistry (as well as psycho-physics and psycho-chemistry). The proponents of reductionism suggest that all higher-order processes may be accounted for in terms of physical and chemical processes. Polanyi allows that every higher-order process depends upon the proper functioning of physical and chemical processes. Thus disruptions in any organism can sometimes be accounted for in terms of physics and chemistry; yet, physics and chemistry cannot be expected to account for higher-order processes such as heliotrophisms in plants and problem-solving activity in the higher animals. Hence, malfunctioning can sometimes be specified in terms of chemical imbalance; proper functioning however cannot be so specified. Bio-chemistry can stipulate the necessary conditions for organismic health without being able, in itself, to stipulate just what constitutes health in this or that particular organism. Only animal physiology can discern what organismic functioning is to be regarded as healthy or sickly. Thus higher order processes depend upon the proper functioning of lower order processes but they are not as such reducible (or specifiable) to these lower order operations.

Boundary control has the satisfying feature of fully acknowledging the uniqueness of operations on the subatomic level as well as on the personal, human level. Boundary control (a notion derivative from quantum mechanics) means that (a) two successive levels of reality are governed by their respective processes, but (b) the lower-order operating principles leave undetermined their boundary conditions such that (c) the higher-order operating principles harness the lower-order processes by giving it determinate boundary conditions. This can be illustrated, for our purposes here, by making reference to some artificial systems, such as a watch or speechmaking.

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[1] Psychism endeavors to take some form of higher-order process which has both physical and mental dimensions and to suggest that all lower-order processes are downgraded instances of the fundamental higher-order process. The heuristic advantages of psychism are supported by man's natural propensity to project his human processes into objects under examination. Thus, perceptions and affections can be identified within laboratory animals and household pets as downgraded instances of human perceptions and human affections. With massive further downgrading, affections can be specified by the trophisms of plants and intermolecular attractions.

As will be shown, Polanyi avoids this by allowing boundary control to allow both the interpenetration and yet the operational independence of various levels of reality. More particularly, Polanyi here parts company with evolutionary philosophers such as Whitehead and Teilhard insofar as they endeavor to apply the same operating principles to all levels of reality and only admit a difference in degree rather than an irreducible difference in kind. With respect to Whitehead, cf. the transcription of Polanyi's discussion with Dr. Raymond E. Wilken (unpublished--write Department of Secondary and Continuing Education, University of Illinois: Urbana, Illinois, 61803).

Consider the watch. On one level, mechanical (engineering) principles are operative: the mainspring, escape mechanism, gears, etc. are designed with these mechanical principles in mind. On another level, however, the watch designates the time of day. This higher-order principle is not reducible to mechanical laws, yet it harnesses these laws by exerting boundary control. Or, to put it differently, the self-same mechanical laws could serve lunar time-pieces or astral time-pieces--this is what is meant when we say that lower orders of operation leave open (undetermined) their boundary conditions.

Consider, again, speechmaking. The following levels suggest themselves:

phonemes (human sounds, easily reproduced)
words
sentences (grammatical structure appears here)
the speech
the purpose of the speechmaker

Note that each lower-order leaves open its internal constitution at the boundary where the next higher-order operation supplies the determinate conditions which would otherwise be left undetermined. Yet, words cannot be reduced to phonemes (nor sentences to words, etc.). Words rely upon phonemes but surpass them in their own order of operation (likewise, sentences rely upon words, etc.).

Having specified the meaning of boundary control, the study of man can now be re-undertaken. For man, the following levels suggest themselves:

physical and chemical processes (man as a set of atoms)
cellular processes (man as a set of cells)
neuro-muscular processes (man as a physiological network)
process of responsible choosing (man as moral)
social-cultural processes (man as sharing corporate ideals)

Consider again the athletic performance. The human purposes of the athlete set boundaries upon the sequence of neuro-muscular movements necessary for his performance. Achievement is limited by the athletes neuro-muscular tone. As seen from below, however, the neuro-muscular processes are enhanced by participating in higher levels of achievement (of which they can know nothing). The same thing can be said for each successive level of operation.

Now it can be asked whether human purposes serve a higher-order of achievement which harnesses individual achievements? On one side, man is his own justification; on the other side, man enhances his own self by recognizing standards of excellence which surpass and subsume his own individual performance. Thus, the athlete recognizes standards of athletic performance and allows them to inform his personal performance. And where do these universal standards exist save in their being corporately shared among a community of athletes (and a supportive community of spectators). Thus, man himself who is the measure of things is himself measured by the standards of excellence which enhance his individual performance by drawing it together into a corporate achievement. Communities and civilizations are thus created by man so that an individual might advance his personal self-actualization in such a way that his personal achievement might serve a higher-order corporate achievement. In so doing, an individual is rendered capable of a self-transcending achievement.

(C) Within this perspective of levels of reality and boundary control,

Polanyi insists that the whole arduous process of cosmogenesis must at every turn be open to an achievement unspecifiable by the then-existent cosmic order. Thus the directed groping toward higher achievement within cosmogenesis presents an adequate set of clues for discerning a cosmic field[1] which functions as the orderly innovating principle.

Polanyi joins with Whitehead and Teilhard in disquieting those who would endeavor to reduce creative advance to a series of random mutations followed by survival of the fittest. For Polanyi, no accumulation of haphazard mutations can envision a bold achievement requiring higher operational principles.[2] Thus nuclear inter-actions cannot give direction to chemical interactions; chemical interactions cannot give direction to organismic interactions; organismic interactions cannot give direction to inter-personal interactions. Polanyi laments Teilhard's shrugging aside the mechanism of heredity by allowing that groping means "to try everything."[3] Unrestricted novelty could lead only to chaos. Mutations must be only the occasion for a preferential scope of changes, and environmental conditions must be only a subsidiary order capable of serving an indeterminate range of novel organisms.

The presence of directed groping toward higher achievement reveals the hidden presence of a cosmic field which acts as an orderly innovating principle. Thus, the entire evolutionary process stretching over billions of years can be interpreted as due to the creative initiative of the

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[1] PK, 385, 398 ff.

[2] Ibid., 381-85.

[3] Cf. Polanyi's review of Teilhard's Phenomenon of Man: "An Epic Theory of Evolution," Saturday Review, XLIII (January 30, 1960), 21.

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cosmic field.

Recognition of the cosmic field places man in an irreducible tension. Negatively, man finds himself in a cosmic order which is passing away (dying) in order to make room for a higher cosmic order which is already beginning to appear. Positively, man finds that his aspirations for self-transcendence are ratified by the manifestation of a universal creativity which is guided by the cosmic field (which includes both organismic and heuristic aspects) to accompany man toward ever-greater achievements. As a consequence, holding to the status quo and resisting all novelty is just as untenable a position as a random grasping at every novelty in a frenzied quest for self-fulfillment. The cosmic field as well as the present cosmic order does not embrace, willy nilly, just any and every set of human aspirations. Not even a passionate earnestness can justify the quest for delusions. Genuine discernment is required. Novelty can represent a fall to a lower order of human achievement: men's lives have often been dehumanized or stunted by irresponsible alterations or neglect of sound cultural traditions. On the other hand, a genuine openness to the cosmic field followed by a courageous and prudent implementation offers mankind the occasions for an enriched future beyond many of his present wildest imaginings.

As a consequence, the Christian stance[1] with respect to his God is herein respected and enlarged. It is respected insofar as the Christian

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[1] Polanyi himself offers extensive treatment of levels of reality, boundary control, and the cosmic field; but he does not spell out any extensive treatment of Christianity. However, from time to time he does offer clear insights as to how his perspective relates to the Christian tradition. The following is offered as one summary statement which does relate in his own terms the experience of the cosmic field and the experience of God:

> So far as we know, the tiny fragments of the universe embodied in man are the only centres of thought and responsibility in

God is not to be equated with the enabling and hindering powers of this world but is to be specified as their author. It is further respected insofar as the cosmic field[1] is held responsible for the creative innovations whereby higher orders of achievement are induced within the present cosmic order. On the other hand, the Christian stance with respect to his God is enhanced (a) by further freeing God from any parochalism whereby his initiatives are limited to a particular nation or church community and (b) by further emphasizing that God's initiatives within the world fully respect the rightful independence of every lower-order level of operation.

(a) The implications of the above for the Christian community are momentous. The Christian who is carried away into discovering his God within the universal initiative of the cosmic field can no longer restrict the beneficent creativity of his God solely to his Hebraic-Christian ancestry. In fact, just as Jesus was able to see the graciousness of the Father's rain as blessing all men impartially; so too, the Christian is impelled to perceive God's initiatives within the whole space of

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> the visible world. If that be so, the appearance of the human mind has been so far the ultimate stage in the awakening of the world; and all that has gone before, the strivings of a myriad centres that have taken the risks of living and believing, seem to have all been pursuing, along rival lines, the aim now achieved by us up to this point. They are all akin to us . . . We may envisage then a cosmic field which called forth all these centres by offering them a short-lived, limited, hazardous opportunity for making some progress of their own towards an unthinkable consummation. And that is also, I believe, how a Christian is placed when worshipping God [PK, 405].

[1] Cosmic field is here understood as the word designating that-which-directs-cosmic-emergence. The ordered cosmic emergence prompts us to use such a word. However, as Thomas Aquinas is well aware, the use of the word God has the same implications:

> God is not known to us in His own nature, but through His works or effects, and so, as we have seen, it is from these that we derive the language we use in speaking of Him. Hence 'God' is an operational word in that it is an operation of God that makes us use it--for the word is derived from his universal providence: everyone who uses the word 'God' has in mind one who cares for all things (Thomas Aquinas, Summa Theologica, I, q. 13, a. 8).

of universal history.[1]

In consequence, communities devoted to Buddhism and Marxism must be recognized as animated by reverent responses to the discerned initiative of the cosmic field (which Christians also endeavor to correctly discern and serve). Here it can be granted that Buddhism recognizes no personal deity; yet, in discerning those cosmic processes wherein man might attain the perfection of cosmic self-harmonization, the Buddhist is engaged in a process of discerning God.[2] In like fashion, Marxism, as it is practiced today by the Chinese Communists, even though it explicitly denounces a Christian self-understanding, does not fail to propose that the clues offered by history are sufficient to direct man's efforts toward a self-transcending achievement which requires man's self-

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[1] The contention that God's initiative (and consequently his self-revelation) is effective in the whole of history has gained an increasing number of adherents within the last decade. Formerly it was proposed by Hegel and his disciples. It was implied by Schleiermacher and his disciples insofar as the religious experience of the absolute was proposed as a potentially universal phenomenon. In recent years the most forceful proponents of God's universal self-revelation in history have been Pannenberg, Moltmann, Harvey, Rahner, Moran, and Cohen. Representative works would be the following: Wolfhart Pannenberg, "Dogmatic Theses on the Doctrine of Revelation," Revelation as History (New York: The Macmillan Co., 1968); Jürgen Moltmann, Theology of Hope (London: SCM Press, Ltd., 1967); Van A. Harvey, The Historian and the Believer (New York: The Macmillan Co., 1969); Karl Rahner, Hearers of the Word (New York: Herder and Herder, 1969); Gabriel Moran, The Present Revelation (New York: Herder and Herder, 1972); Arthur A. Cohen, The Natural and the Supernatural Jew (New York: Pantheon Books, 1962).

[2] Cf. especially Ninian Smart, "The Work of the Buddha and the Work of Christ," The Savior God, ed. by S. G. F. Brandon (Manchester: Manchester University Press, 1963), as also the early work of Rudolph Otto Mysticism East and West (New York: The Macmillan Co., 1928).

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dedication.[1]

In parallel fashion many contemporary movements within our present society can no longer be dismissed as secular (i.e., as detached from the religious sphere). Thus Women's Liberation is the dedicated response of a significant minority of American women who have discovered a new self-identity which they have found to be abundantly life-giving.[2] The Christian cannot remain unmoved by this sign of his times. He must discern therein the character of God's present initiative and correctly direct his personal activity as guided by his discernment. Needless to say, some Christians have already judged Women's Liberation as directly opposed to the nature and function of woman as God has created her to be within the Hebraic-Christian tradition. Other Christians, however, understand Women's Liberation to be God's initiative in saving both men

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[1] This contention was perhaps assumed by Thomas J. J. Altizer in The Gospel of Christian Atheism (Philadelphia: Westminster Press, 1966) when he finds Nietzsche and Blake as fitting revelatory sources for a new Christology. More important, however, is the dialogue between Christians and Marxists which has been steadily growing since 1964. For a perspective regarding how Marxism can be situated as a transmuted Christianity, see Roger Garaudy, "Faith and Revolution," Cross Currents, XXIII, 1 (Spring, 1973), 31-37, or Ernest Block, Man on His Own (New York: Herder and Herder, 1970). Both of these sources find Christianity as a viable source for discerning "the unconditional and total content of hope." Marxism as a transmuted Buddhism can be found portrayed by Manuel Sarkisyanz, "Buddhist-Marxist Syncretism in Burma," Proceedings of the Eleventh International Congress of the International Association for the History of Religions: The Impact of Modern Culture on Traditional Religions, vol. 1 (Leiden: E. J. Brill, 1968), pp. 92-98.

[2] Women's Liberation as offering the clues to God's present initiative in history has received little theological attention. A notable exception is Gabriel Moran's The Present Revelation (New York: Herder and Herder, 1972), pp. 66-69. Mary Daly addressed this theme in her public address, "Sisterhood as Revolutionary and Revelatory," given at the United Theological Seminary, Dayton, Ohio, on March 29, 1972. This is also the implied theme of her last chapter, "The Second Sex and the Seeds of Transcendence," in The Church and the Second Sex (New York: Harper and Row, Publishers, 1968), pp. 178-82.

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and women from the banal repetition of an increasingly dysfunctional set of sexual roles which fail to acknowledge the new blessings and curses associated with living in the megatropolis. That there should be Christian prophets who clash in their discernment of how-God-is-currently-disposed with respect to that-woman-which-God-enables-all-women-to-be is to be expected. A theology of revelation which directs attention to God's present initiatives in history could not and would not permit a standoffish Christianity.

What has been said with respect to Buddhism, Marxism, and Women's Liberation can be extended to every domain of our society. Crimes in the ghettos, a space walk, the Watergate hearings; the Christian must discern man creating man in response to his discernment of God within all of these events. So too, each Christian must know that the day-to-day events of his life do indeed fashion the shape and character of his own destiny. To discern God's initiative here is to take personal responsibility for creating oneself and also untold others both present and future. To discern God's initiative here means to discern one's personal vocation. God's self-revelation here means that-man-whom-God-is-enabling-me-to-become: it is to perceive God creative initiative in one's own life. And for this the Christian has the Old Testament paradigms of Abraham and Moses and Samuel and Judith and Jeremiah. But especially the Christian has the paradigm of Jesus who was created the New Man by the Spirit of God. How Jesus fits into the Christian task of discernment will be returned to shortly.

(b) A second momentous implication of the foregoing perception of God's activity is the emphasis that it places upon the rightful independence of God and man. God need not be the one who miraculously supplants the present order in order to accomplish his will; He need not destroy the city of man in order to construct the city of God.[1] Boundary control

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[1] Jewish apocalyptic literature (e.g., Deutero-Isaiah and the Book of Enoch) customarily depicts God's initiative by way of a terrible destruction of the present order so as to allow the construction of a new order. The New Testament retains such apocalyptic theology in March 13 (and paragraph) and the Book of Revelation. This apocalyptic theology suggests a cataclyptic destruction-construction and runs counter to a theology which proposes a gradual, step-by-step, realization of the Kingdom of God.

Popular Christianity favors a cataclyptic escatology: either by envisioning the final destruction of the world followed by the revelation of the New Jerusalem coming down from heaven or by envisioning the destruction of the body followed by the revelation of God to the graced soul in heaven. There is some basis for this in the early letters of Paul and the early Gospels. As regards the perspective of Jesus (as distinguished from that of his disciples), some scholars believe that Jesus did expect some manner of vindication and judgment relative to his engagement on behalf of God's new initiative in history; however, Mark 13 (and paragraph) and the Book of Revelation are regarded as the imaginative constructions and borrowings of the Christian writers. Cf. Norman Perrin, Rediscovering the Teaching of Jesus (New York: Harper and Row, Publishers, 1967), pp. 154-206.

What is perhaps more significant is the transition from cataclyptic escatology to developmental escatology as presented in Luke, John, and the later writings of Paul. Our intention her cannot be to resolve this question in favor of one and in opposition to the other. Suffice it to say that a people who believe in God's novel initiative which will be disclosed in the future have the option of expressing that hope in terms which correspond to their general mindset. Hence, a powerless, divided people under foreign domination cannot but imagine that their vocation from God to be a free people must arise by the cataclyptic destruction of their conquerors by the might of God alone (even though the Old Testament theology consistently depicts men acting with God's power and upon his initiative). For our purposes in these theses, it will suffice to indicate a mindset wherein the future of God can adequately be understood as radically transcending the present order. As has been shown in our discussion relative to discovery, novelty implies both continuity and disruption. In like fashion, for the Christian, Jesus presents the paradigm of the New Man acting in behalf of God's Kingdom. The nonviolence of Jesus runs quite counter to the violent vindication expressed in apocalyptic literature. It is true that Jesus provokes psychological and social disruption; but it is the passionate resistance of the status quo (with its covert violence) which proposes a violent liquidation of Jesus and his disciples. Thus the violence in the Gospels might be construed as entirely the demonic resistance to God's entirely constructive initiative. In opposition to traditional exegesis, Werner H. Kelber insists that "conflict is first and foremost not the harbinger of the Kingdom, but directly effected allows God to be supremely present without being supremely disruptive. The operation of the megamolecules is not suspended in being drawn into the cellular processes. So too, the human processes of responsible discernment (human knowing and human choosing) are not suspended in being drawn into the Divine purposes. Just as the operations of the megamolecules are drawn unimpaired into self-transcending operations in the living cell, so too, man's human operations are drawn unimpaired into the self-transcending will of God. The Christian will want to claim, therefore, that critical intelligence and responsible dedication are fully respected by God's initiative. Speaking anthropomorphically, this claim implies that God patiently waits for man to discover His initiative and to freely discern (sometimes mistakenly) how he should appropriately harmonize his activity with that initiative. Thus God is here claimed to be sufficiently secure in his own personhood so as to refrain from every form of coercion (whether by an infused inspiration or by promises and threats)--the Christian God is Love which dispels fear and manipulation.

Now it can be suggested that the discernment of God's initiative takes the form of undertaking a cosmic apprenticeship. Within this perspective, it is quite clear that God has not fashioned man in a day; but that He has patiently guided man through progressive feats of actualization within an extended history. As a result, the actual program for the actualization of each new man is largely inherent within stabilized ontogenetic and psychogenetic processes harmonized with stabilized cultural processes. As a result each man is initially shaped

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by the Kingdom's eruption in history." Cf. Kelber, "The History of the Kingdom in Mark: Aspects of Markan Escatology" (an unpublished report prepared for the Markan Task Force of the Society of Biblical Literature, September, 1972).

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by a genetic code and a language code which fashion his organismic powers and tacit skills. As has been explained, his belonging to particular parents within a particular culture primarily determines the range of self-actualizations open to him during the entire course of his life. The primary calling[1] of each new man, therefore, consists in enhancing his own performance by assimilating culturally-given standards of excellence which surpass and subsume his own individual performance. Yet, while man himself has the sacred obligation to fashion his children and his apprentices according to his own image, it can be recognized that man himself has received his own image through progressive feats of revelation/actualization within an extended history of God's presence. Hence, in the Christian perspective, man creates his fellow man (via dependent revelation) just as assuredly as God creates man (via primary revelation). Man calls to his fellow men to undertake free commitments to the old social order in which they are born; God calls to men to undertake free commitments to the new social order which is ripe for birth. Thus is the call found in Deutero-Isaiah:

> Let Yahweh show His Glory . . . .
> Long before being in labor
> She [Jerusalem] has given birth.
> Before being overtaken by birth pangs,
> She has been delivered of a boy.
> Who ever heard of such a thing,
> Who ever saw anything like this?
> Is a country born in one day?
> Is a nation brought forth all at once,
> that Zion just in labor should bring forth sons?
>
> Am I to open the womb and not bring to birth?
> says Yahweh.
> Or I, who bring to birth, am I to close it?
> says your God.[2]

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[1] The calling of man to accept obligations within a limited personal and communal setting with the hope of thereby serving a transcendant future becomes, for Polanyi, the abiding vocation of every man. Outside of such freely accepted commitments, Polanyi sees no avenue for the creative advance of mankind. Cf. PK, 321-24; TD, 55-92.

[2] Isaiah 66: 5-9.

Teilhard, echoing the confidence of Deutero-Isaiah, reflects that the forces which brought man to birth do not abandon him in his finest hour but accelerate him forward via "a maturation and a paroxysm leading ever higher into the Improbable."[1] Polanyi, from his perspective, senses that man is called to understand himself as coaxed by the cosmic field to become a society of Explorers:

> This part of the universe, in which man has arisen, seems to be filled with a field of potentialities which evoke action. The action thus evoked in inanimate matter is rather poor, perhaps quite meaningless. But dead matter, matter that is both lifeless and deathless, takes on meaning by originating living things. With them a hazard enters the hitherto unending universe: a hazard of life and death.
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> The field of new potential meanings was so rich that this enterprise, once started, swept on toward an infinite range of higher meanings, unceasingly pouring them into existence, for the better part of a billion years. Almost from the start, this evolutionary response to potential meaning had its counterpart in the behavior of the living things it brought forth. It seems that even protozoa have the faculty of learning; they respond to potential meaning. Rising stages of evolution produce more meaningful organisms, capable of even more complex acts of understanding. In the last few thousand years human beings have enormously increased the range of comprehension by equipping our tacit powers with a cultural machinery of language and writing. Immersed in this cultural milieu, we now respond to a much increased range of potential thought.
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> It is the image of humanity immersed in potential thought that I find revealing for the problems of our day. It rids us of the absurdity of absolute self-determination, yet offers each of us the chance of creative originality, within the fragmentary area which circumscribes our calling. It provides us with the metaphysical grounds and the organizing principle of a Society of Explorers.[2]

This is what Samuel meant when he anointed Saul promising that "the spirit of Yahweh will seize on you and you will go into an ecstasy with them (group of prophets coming from the high place) and be changed into another man."[1] This is what Mark meant when he depicts the Spirit descending upon Jesus during his baptism by John just before Jesus was driven by that Spirit into the wilderness in order to emerge therefrom proclaiming God's new order. This is what Matthew implies when he spells out the impressive geneology of Jesus and then turns around and insists that Jesus was a new creation born within the womb of the Virgin Israel.[2] This is what Augustine meant when he wrote his autobiography as the revelation in his deepest heart of God's purposes in his life. And so it continues to our present day. Our belonging determines the shape of our perceiving God as He-who-shapes-man-in-his-own-image. Our belonging also determines the shape of our self-perception. Yet in this process directed novelty enters in--novelty which is sometimes evil because it is born out of its due time and will curse and deform many; novelty which is sometimes life-giving because it is born out of man's timely response to what he discerns as that-man-whom-God-will-enable-me-to-become.[3] Thus every new man begins by being formed according to the tacit skills of the old man (the man of tradition) and then, by a feat of passionate discovery, the old man is transformed into the new man (thereby distinguishing himself from the very tradition which engendered him). And so it is that the sacred task of every historic religion is to initiate its adherents into a sustained fidelity to a historic series of prophetic revelations so as to be able to perceive the living God as he calls man into new existence within the dynamics of history.

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[1] Pierre Teilhard de Chardin, The Phenomenon of Man (New York: Harper Torchbooks, 1965), pp. 233 and 276.

[2] TD, 90-91.

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[1] I Samuel 10:6.

[2] This parallels Paul: "If anyone is in Christ, he is a new creation. The old order has passed away; now all is new" (II Corinthians 5:17). The present exegesis has been suggested to me by Herman Waetjen of the San Francisco Theological Seminary (San Anselmo, California) and is shared by Bruce Vawter, This Man Jesus: An Essay Toward a New Testament Christology (New York: Doubleday and Co., Inc., 1973), p. 191.

[3] The suggestion here and in the Augustinian reference just above is that the discernment of God is tantamount to the discernment of man's individual/collective God-given vocation. Often the theology of vocation suggested that each man was to grope for the predestined call of God which alone is capable of securing his happiness. Our perspective here accepts such a designation but insists that the call of God always has a collective and historical dimension which, at every moment, sustains and blesses a range of possible modes of self-actualization (rather than a single, definitive call). This coincides with contemporary experience

In retrospect, therefore, God's will cannot be construed as in any way diminishing or supplanting man. Rather the notion of boundary control allows God to be present in the world, not by miraculously suspending its operation, but by harnessing its independent processes toward a higher achievement. God's imminence in the world is directed toward freeing the cosmos (and more especially man) from banal repetition of the present order of satisfaction. As the *cosmic field*, God achieves this salvation by supplying the boundary control which lures the given processes toward a self-transcending accomplishment. Yet, God's presence awaits man's recognition and free response. The

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whereby the existing stable order supports a given range of vocations; and this coincides with revolutionary new orders which support another range of vocations. Every concrete historical person must discern the specifics of his particular calling from among the range of potential modes of self-actualization. The passionate self-satisfaction incumbent upon the recognition of one's calling has been oftentimes termed the grace of vocation. This grace, as it is here understood, is the gift of God at the same time that it is the gift of the community. As is seen from the citations of Scripture above, a revolutionary vocation is assigned to God as its author. This follows upon the realization that the conservative community does not take responsibility for engendering revolutionaries; in fact, it generally takes measures to neutralize or eliminate innovators. An insightful account of the revolutionary vocations of men such as Daniel Berrigan, Malcolm X, and Ernesto "Che" Guevara can be found in Eugene C. Bianchi, *The Religious Experience of Revolutionaries* (Garden City: Doubleday and Co., Inc., 1972). These specific vocations bear out the general lines of thought specified in the preceding five pages.

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Christian God is thus rightly the Supreme Creator and the Suffering Servant. And when these two incompatibles are integrated, God is felt as the cosmic field which meets man where he is and serves him there only to lure him toward an ever-greater achievement. Thus God is neither the self-centered-One on an ego trip, nor is he the self-losing-One solely content with securing man's selfish interests. He is the-One who enters into fellowship without losing himself. As a consequence of this recognition, the entire Christian enterprise can be described as the enjoyment of that creative fellowship between God and man.

(D) Reality is never comprehended in its entirety in the first instance of its appearance; thus, the reality of the Christian God must be grasped through a long series of revelations. This same notion applies to cobblestones, automobiles, friends, etc. Each of these realities manifests itself through incarnational clues which the skillful knower integrates. The variety of self-manifestations open to cobblestones is quickly exhausted (unless you are a geologist or sculptor). Automobiles have a more profound series of self-manifestations and are capable of occasional novel appearances. A friend is seemingly inexhaustible in the richness of self-manifestations and the range of novelties of which he is capable. God, in the Hebraic tradition, constitutes a reality which an entire nation over hundreds of generations never exhausted. Thus the reality of God with respect to the world is personal in character.[1] The Sacred Scriptures had to constantly be expanded and revised to account for the novel manifestations of the living God. Thus the initial chapters of Genesis did indeed suffice to articulate adequate clues relative to man's mytho-poetic beginnings; but later epochs found it necessary to complete and transmute this account.[1] The later prophets such as Ezekiel and Deutero-Isaiah found little satisfaction in past events and looked forward to providing the necessary clues of who-God-enables-man-to-become by relating man's mytho-poetic end. Jesus and the community following him were likewise intend upon the end-times characteristic of the late Jewish prophetic tradition. The processes implicated in this ever-fruitful and progressive discovery of God-for-us as found among Jesus and his disciples will be taken up now in the fifth and final thesis.

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[1] The personal character of God follows from the acceptance of a dynamic series of self-manifestations. Persons are responsive and innovative in ways which things and animals cannot be. Saying that God has a personal character, then, implies more than the recognition that God affects us personally. Things and animals also affect us personally, especially when one becomes attached to them. Nor does this mean that we relate to God as if He were a person. No, God Himself in the seeming

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richness of his self-manifestations in history has a personal character *per se*. Because of this it can be said that the personality of God has changed within the dynamics of history in precisely the manner in which one would expect a creative and responsive individual to change. Classical theology has oftentimes tried to save the unchangableness of God (a) by insisting that the changableness of God is apparent only from man's side and (b) by insisting that God has programmed his entire future such that he never has to originate a new decision. Our intention is not to argue against this perspective but simply to note again that God's transcendence is not knowable to man. Hence, his immanent created initiatives must be relied upon for discerning the real living God. Now it is this living God who shows himself to be personal in character. This conclusion reinforces Thesis II above.

[1] Cf., e.g., Psalms 8 and 104; Ecclesiasticus 42: 15-43:35; Baruch 3:24-35; Job 37-40. Even the initial chapters of Genesis contain two, possibly three, accounts which were formed by divergent religious perspectives within Judaism.

Thesis V. Withstanding all Christian rhetoric to the contrary, the Gospels stand in permanent testimony that Jesus is understandable only (but not solely) in terms of the disruptive change he provoked (and is provoking) due to his fresh discovery of God. The actual nature of Jesus's own discovery cannot be fully specified; nevertheless, the processes wherein his discovery took place needs to be accounted for within the self-same organismic, sociological, and epistemological processes which govern all human discovery. By so doing Jesus does not lose anything of his normative, paradigmatic character within the Christian apprenticeship; in fact, such a perspective renders credible the Christian aspiration of becoming empowered with the same skills as his Master so as to dedicate his energies with his Master as a harbinger of God's inbreaking new order. The Christian, therefore, must expect that his own individual and shared skills of discernment, of celebration, and of dedication are the indispensible means whereby Jesus-with-His-disciples-both-then-and-now actualizes (i.e. incarnates) the blessings of the Reign of God in human history.[1]

(A) The present thesis does not presume to spell out a complete Christology. Yet, on the basis of what has already been presented, Jesus must either be portrayed as harmonious with the human processes implicated in man's responsive discovery of God's initiatives or he must be cast as an exception. Now the Christian tradition has insisted that Jesus is truly man. Thomas Aquinas understood this to mean that every human power proper to man must not only be present in Jesus but must be actualized by its proper activity. Thus, Thomas suggested that in addition to the infused knowledge of Jesus which is the knowledge of vision, there must also be acquired knowledge by personal discovery[1] (since it was unfitting that the Teacher of all should himself be taught by another man).

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[1] This final thesis represents the present author's attempt to spell out some of the Christological consequences which follow from the preceding four theses. Polanyi does not explicitly address these issues. The reader is now essentially being addressed by a series of theological assertions relative to the revelatory presence of God in Jesus and in his (historically-related) disciples.

Applying this insight to our present understanding of the human processes relating God and man, our task will be to portray Jesus as fully implicated in man's responsive discovery of God's initiatives. In so doing Jesus will again be rooted within his particular Palestinian milieu where his personal drama was shaped by both men and God. Whatever Jesus was in his own milieu is largely lost to us due to the immense cultural gap which separates our settled instincts. What seems most evident in the testimonies of the New Testament, however, is that Jesus was experienced as an innovator who roundly disturbed those who came to know him. His enemies accused him of being a drunkard and glutton, of cavorting with undesirables, of insulting God and serving some demon, and of endangering the tenuous political power which the Sanhedrin shared with their Roman conquerors. In the response of his friends, Jesus was the way-shower--the hero who gave meaning to their lives. They viewed his banqueting (with those whom the so-called pious Jews considered undesirable and corrupting company) as the sign that God-for-us is felt as the-One-who-leaves-those-who-are-smug-in-their-self-sufficiency-in-order-to-seek-out-those-who-are-needful. They viewed his selective disregard for the Mosaic tradition as a sign that God-for-us is creating a new order which is inhibited by formerly-revealed ways of acting. They viewed his personal use of power as liberating them from their debility and securing them within the enabling powers which stood as signs that God-for-us is felt as the-One-who-sends-them-the-assistance-of-their-neighbor. All of this leads to the conviction that the Gospels retain for all time the image of the man who disturbed the prevailing order on the basis of his personal convictions. Whatever the Christian community may have taught in its embarrassment over the disruptions of Jesus, the Gospels stand in permanent testimony that the roots of the Christian tradition are understandable only in terms of disruptive change provoked by the fresh discovery of God.

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[1] Thomas Aquinas, Summa Theologica, III, q. 12, a. 1-3 and q. 15, a. 8.

(B) The actual nature of Jesus' own discovery cannot be fully specified (as has already been explained). It is not permissible, however, on that account to treat the discovery of Jesus as something dropped fully-formed down from heaven. If this were the case and Jesus were by some miracle able to comprehend it, then it still would not be communicable to anyone else unless, of course, their comprehension rested upon a miraculous duplication of what Jesus experienced. While such supernatural interpretations of revelation and faith have guaranteed a self-satisfying meaning for many generations of Christians, they can provide little satisfaction for a Christian who endeavors to integrate his Christian self-understanding within the settled instincts of modern man. Furthermore, the New Testament writers themselves present Jesus as preaching his good news which itself produces amazement at its felt authority (and, most likely, at its felt power to dispel demonic hinderances and to impart new enabling powers).

The interpretation which Polanyi might bring to bear here is the conviction (a) that Jesus himself is a man of his times who within his apprenticeship to his Jewish community acquired the faith performance which constitutes the necessary backdrop for his personal, passionate, and self-giving act of discovery which disclosed God-for-him in a manner not explicitly embraced by the Jewish tradition but which was, none-the-less, implicitly prepared for by the past creative evolution of that tradition; (b) that Jesus himself is sustained by the passionate conviction and reverent submission to the God which his personal revelation enables him to perceive; (c) that Jesus could not appeal to the *status quo* for communicating his novel perception and is forced to artistically draw the attention of his sympathetic listeners to a new selection of clues which might enable them to bridge the logical gap which separates the old from the new; (d) that Jesus communicates very little to the casual listener and that only those disciples who enter into a prolonged apprenticeship under his guidance are able to assimilate the full scope of his faith; (e) that the disciples themselves are forced in their turn to rely upon the faith of their listeners as the necessary backdrop whereby they might lead them, within a careful selection of clues, to share the realization that they themselves had arrived at under the guidance of the Master.

In this perspective the ample references in the New Testament to the fulfillment of prophecy found in Jesus takes on a decisive significance. They attest to the conviction of the authors (and their like-minded communities) that the very dynamics which they reverenced in the past has now been experienced to move them into their present acceptance of Jesus as the completion of all-that-God-intended-them-to-be. Put more simply, the whole faith of their upbringing seemingly brought them into a personal configuration whereby they discovered in Jesus the incarnation of that-which-they-felt-themselves-called-to-become.

At one instance Jesus is the paradigm of the perfect response to the Father. In another instance Jesus himself incarnates and makes visible the character of God's initiative.[1] In either instance the disciple is required to reverently contemplate the words and works of Jesus so as to assimilate within himself their meaning. In so doing the disciple (in every era) is empowered with the same skills as his Master (who is felt as alive within the community which perpetuates his Spirit). As a consequence Christians know themselves called by the Father to exercise a universal love which drives out all manner of obstructions in order to heal and strengthen men in the image of that-man-whom-God-enables-all-of-us-to-be. And that man is the Sinless One, the New Adam, the Universal Judge, the Holy One of God, the Word made flesh, Jesus Christ. In effect, therefore, Jesus represents the incarnated realization of that-man-whom-God-enables-all-of-us-to-be.

Within this perspective Christianity can be understood as the community which guides its adherents in their choice of heroes. Polanyi recognizes that our heroes arouse in us directed and passionate action, whereby we continue to uphold and enhance the self-same purposes as they as they exemplified in their lives.[2] In this regard the Christian heroes are Jesus and his saints. But more, Polanyi notes that the reverent submission to our heroes informs and transforms our tacit powers so as to enhance our life with superior skills of achievement.[3] As a result the Christian knows his life to be transformed and graced

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[1] The making-manifest may be considered as the consequence of his own perfect responsiveness. Just as an apprentice learns to make-manifest his master due to his attentive responsiveness; so too, Jesus becomes the incarnate God (in his personal performance) because he does nothing, and says nothing, which he does not learn from His Father.

[2] SM, 96; TD, 51-52.

[3] SM, 97-98; TD, 61.

(i.e., gifted with the Spirit of Jesus residing in his community of saints).

(C) By rooting Jesus within the organismic processes whereby God is discovered and within the historical processes of Palestine, Jesus does not thereby lose anything of his normative, paradigmatic character within the Christian apprenticeship. In fact, such a perspective renders credible the Christian aspiration of becoming empowered with the same skills as his Master so as to dedicate his energies with his Master as a harbinger of God's inbreaking new order. The Christian chain of discipleship, therefore, has the noble purpose of perpetuating from generation to generation the tacit, organismic skills which Jesus originally taught his first disciples. Needless to say, these skills have been transmuted through the centuries. Yet, this is to be expected. Jesus did not limit his disciples to blindly reproducing his response[1] to the Father; he taught them to perceive the Father and to follow His initiative wherever it might take them. The chronicles of primitive Christianity (especially Luke - Acts) attest to the continual discernment exercised by Christians in their service to God.

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[1] While the early disciples showed a deep reverence for the enabling powers that they had acquired from Jesus, there are ample manifestations that each disciple assimilated the faith performance of Jesus as his own and took his personal stance within the heuristic framework that it provided. The New Testament accounts amply recognize creative innovations (all attributed to the same Spirit that animated Jesus). Sometimes it rings a cautionary note and identifies some innovations as incompatible with Christianity; at other times it praises innovations and strongly encourages them as incumbent upon all who would grow (in that Spirit which animated Jesus). In all of this there is little evidence that either Jesus or his disciples expected some manner of sterile repetition of their achievements. Quite to the contrary, Jesus himself provided the fundamental paradigm when he himself placed supreme reliance in his personal discovery over and above the authority of the tradition of his teachers.

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What every age learned from Jesus is not therefore to be construed as the content of his own Palestinian revelation. Needless to say, the Fathers and Doctors of the Church were convinced that their own perception of God was the same as that of Jesus; yet, it must now be accepted that their historical perspective and critical self-awareness were slight compared to contemporary scholars. Thus the Fathers were frequently mistaken in their identification of their perceptions with those of the Synoptic writers (each of which endeavors to evoke the particular meaning which he attaches to Jesus). Moreover, it can courageously be admitted that the Protestant reformers as well as the Roman counter-reformers were both frequently mistaken in identifying their respective characterizations of Jesus with the Synoptic characterization. At best their activity can be justified on the basis (a) that the Gospel narratives did indeed serve to induce, guide, and nurture their personal perceptions of God's initiative in the world and (b) that the tacit skills which enabled the early Christian communities to understand the intention of the Gospel writers was no longer available to them. In retrospect, the transforming power of historical dynamics was not their particular problem; yet, our modern critical powers require every Christian to take precisely this dynamic into account.

The implications of the above for Christians is the recognition that their image of Jesus is mediated by a long history of dynamic transmutations. Every Christian is guided by his contemporary tacit skills in contemplating the Scriptures and in participating in the classical religious rituals. The original tacit skills of Matthew, for instance, can only be accessible to scholars as a result of an arduous assimilation of the first century mindset. As such biblical scholars cannot and will not ever discover in Matthew a Christology appropriate to the twentieth century. Yet, the average Christian has no taste for reconstructing the self-understanding of Matthew nor for tracing the obscure dynamic transmutations which have led to the contemporary image of Jesus which his Christian community offers him. In fact, as we have said earlier, an overly critical attitude blocks the reverent submission necessary for assimilating the skills of one's masters. The average Christian, therefore, regards his teachers as reliable in their own personal assimilation of the Master (and thus it is that ecclesial authority must take great care in knowing how to approve of its authentic teachers).

Most Christian teachers, however, are shaped by their tradition so as to construe God's initiative in the world very narrowly. Some find God's initiative as an interior awakening which allows a person to acknowledge God as alive or Jesus as Lord. Others find God's initiative in the evocative power of preaching or in physical and spiritual healing. Still others construe his initiative as operative within carefully-regulated Sacraments. Almost invariably, these perspectives are read into the gospels and found as legitimated upon the lips of Jesus. With a historical perspective and with contemporary biblical scholarship, this manner of relying upon the authority of Jesus is impossible. Jesus can no longer be the only one with vision whom we follow with blind confidence. Jesus can no longer be the only source of authoritative knowledge about God and about human ethics which we must blindly follow. What has been proposed in the five theses above does not allow such a dependence if Jesus is the reliable paradigm of the man open to God. As such Jesus transmits to his disciples the selfsame skills which he exercised; these skills have enabled each generation of disciples to

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discover not only the initiatives of God in the past but moreover the present initiatives of God calling forth a courageous higher achievement. The lesson of the healings is that Jesus' creative fidelity to his vocation proved abundantly creative for those who accepted him. The lesson of the cross is that Jesus' creative fidelity to his vocation evoked passionate and violent opposition in those who sought conscientiously to secure the primary revelation of Moses. The lesson of the resurrection is that the innovative spirit of Jesus is divinely approved and not subject to death, for that innovative spirit of Jesus is none other than the Creative Spirit which is eternally living. The lesson of the Christian communities is therefore, that they too must follow Jesus in opening their lives to the prophetic novelty which was made visible in his life. And so the whole history of the churches has been to alternately follow God's initiative and to impede his initiative. Sometimes the Christian community has Pharisaically persecuted the prophets of God; at other times the community has been persecuted because of their innovations in the name of God. What remains normative for the Christian, therefore, is not one or more of the teachings of Jesus. All his teachings are culturally situated; and it is stupidity to try to recapture the first century man with his God. What remains normative is not his specific activity. All his activity is culturally situated; his vocation remains appropriate only to his Palestinian drama. What remains normative is more important than any of this. What is valid yesterday, today, and tomorrow are the tacit, organismic skills passed from generation to generation whereby each man can assimilate the tradition of his forefathers so as to effectively discern God's initiative within his own individual/collective history. As has been already spelled out, God's initiative is not found in preaching, in healing services, in Sacraments, and not even in the Scriptures. All of these rites created by human artistry can only offer the appropriate sets of clues whereby the Christian leaves his church and discovers God within the breath and depth of the human drama enacted within the city of man. Rituals are for guiding the followers of Jesus into a progressive awakening of their own powers of perceiving and doing such that they can secure the blessings of God within the city of man. The churches and the Scriptures can give a blind man sight--the sight to see God's initiative in the city of man. The churches and the Scriptures can give a crippled man strong limbs--the limbs to act in response to God's initiative in the city of man. The churches and the Scriptures can drive out demons--the demons of infantilism, isolation, powerlessness, insecurity, fear, self-doubt, and idolatry which paralyze men in the secular city.

In closing I would like to paraphrase a section from Polanyi which he applied first to the scientific tradition but insists has equal application to the religious tradition as well:

> The Christian tradition derives its capacity for self-renewal from its belief in the presence of the hidden reality of God, of which current Christianity embraces one aspect, while other aspects are to be revealed by future discoveries. Any tradition fostering the progress of man must have this intention: to teach its current perceptions as stages leading on to unknown perceptions which, when discovered, might dissent from the very teaching which engendered them. Such a tradition assures the independence of its followers by transmitting the conviction that faith has intrinsic powers of discovery to be evoked in men's minds by intimations of God's present initiatives. It respects the individual for being capable of response: for being able to see a problem not visible to others and to explore it on his own responsibility. Such are grounds of religious life in a free, dynamic society: the principles which safeguard religious life in such a Christian community. I call this a society of prophets.[1]

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[1] TD, 82, a paraphrase in which scientific terms were replaced by Christian terms.

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A CONCLUDING POSTSCRIPT

Pushing the implications of the foregoing theses into a full blown description of the Christian enterprise is not the specific task of this dissertation. However, the present writer deems it fitting to briefly sketch, in three broad jumps, a possible characterization of Christianity which is congenial to the program which has just been concluded. What this postscript proposes, therefore is (a) to explore the revelant dimensions whereby one person is able to reveal himself to another, then (b) to characterize the Christian enterprise as an assimilation and transmutation of the personal powers revealed by Jesus, and finally, (c) to suggest how this assimilation and transmutation can be understood to fulfill divine obligations.

(A) How is it possible to assimilate the intellectual performance skills of another? Polanyi answers this critical problem by examining instances wherein the hidden interiority of one person is revealed to another. A favorite instance is that of the chess master.[1] His skilled performance cannot be communicated precisely in rules for the full intent of such formulated rules is only apparent in someone who already has a comparable skill to understand the intent of the rules. As such descriptive rules can only be weakly interpreted by the player who has little personal skill at playing chess; and such rules are apt to frequently mislead him because he projects incorrect meanings therein. Hence, if the tradition of chess were to rely upon rules for its communication, no master could ever hope to share adequately the personal powers that he possessed. His powers would die with him. However, the contrary is true. The current masters of chess sometimes excel all their forefathers precisely because past masters do indeed find themselves capable of transmitting their powers to others and thereby act as stimulants for an enriched tradition of chess strategy. Polanyi explains this transmission of interior powers by referring to the process whereby a student of chess carefully replays the moves of his teachers and thereby comes to possess their own estimate of the worth of a particular sequence of moves. Hence, the recorded games of Fischer and Spassky stand as permanent clues, which the novice in chess can play and replay, thereby gaining an ever greater depth of meaning due to his own increased powers of discovering the strategy hidden therein. The triadic nature of tacit knowing is herein contained. The (1) novice throws himself into (2) clues held in subsidiary awareness while his (3) focal attention grasps for the hidden meaning (which he believes that his masters exemplify therein). From this illustration one can appreciate that the novice, who is the integrative center in knowing, must himself deploy all of his own powers actively grasping for the particular strategy exemplified by his masters. His skill in estimating the performance and interrelationship of the individual chess pieces is presupposed.

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[1] __TD__, 30.

> He must use his own powers to ferret out why this particular move was made. Puzzlement sets in. A coherent strategy emerges as the integrated meaning of this particular move. The Novice goes on. Yet, he is only satisfied for a brief movement, since the next move discredits the strategy which he had mistakenly projected as the meaning of the former move. He goes back. He racks his brain to find another coherent meaning which must now satisfy the two successive moves. When he finally succeeds, he goes on. He may have

> to return again to the first move because subsequent moves betray the meaning which he thought he observed.

In every case the novice replays the games of the masters as if they were his own. By so doing he does indeed gradually enlarge his own powers of strategy by assimilating something of the powers of the masters whose games he studies. Obviously every game is so complex that its full meaning (i.e., the full set of valuations felt at each move with respect to the present threat or opportunity) cannot seemingly be ever fully exhausted. In fact, the masters themselves reexamine their own games (especially their losses) so as to deepen the meaning which they have missed during the game itself. Needless to say, most masters study the best games of their opponents with the full expectation that they will discern the strengths and weaknesses of their strategy.

How is it possible, then, to assimilate the mental performance skill of another? The answer is now clear: one must sympathetically enter into the clues offered by their performance. The clues vary in type. Sometimes there are bodily gestures (ranging from the grimace of an infant to the deliberate movements of the professional dancer). More often, the clues combine material objects which function as extensions of the bodily gesture: clothing, tools, musical instruments, sports equipment, etc. Sometimes, verbal clues are also included (ranging from the babbling of an infant to the full power of a moving orator). In every case the observer cannot remain passive. He must actively penetrate the clues offered by the person revealing himself and discover therein the hidden meaning. Natural gestures, such as the smile, seemingly require little or no learning to discern the hidden disposition which becomes visible therein. Conventional clues,

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such as language, require long hours of patient watching, guessing, repeating to effect any appreciable ease of operation. An adult learning a second language is quickly made aware of the efforts necessary to capture the necessary Sprachgefühl for thinking in another language (without translating phrase for phrase one's native speech). Listening, speaking, reading, and writing skills are distinct (even though they are correlative). In every case, the observer projects the meaning which he discovers in the clues which the revealer offers. Hence, for example, if the language skills of speaker and listener are not matched (and note here that they cannot be directly compared in themselves since they are not open to direct inspection), misunderstanding results. This is inevitable. Meaning is always determined by one's personal history of past usage. Witness the young man who sends a store-bought card to his girlfriend with the caption, "You're an animal," displayed under a cute pink rhinocerous. And inside the card continues, "And I'm an animal lover--please let me tame you." He was thinking of the love relationship between the fox and the Little Prince.[1] His intended meaning was hidden, however, to his friend who found the card suggestive of the exploitive inequality typified by a Playboy philosophy. A projected meaning may therefore be mistaken. Only two people with an identical language history would communicate with complete clarity. Since, in practice, this is never the case, there is always some degree of intentional and emotional discrepancy between speaker and listener. The marvel is that people trained in widely different sectors of the same language community can maintain a modestly reliable facility in sustaining effective communication.

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[1] This is a central part of A. de Saint-Exupéry's The Little Prince.

(b) The foregoing response as to how it is possible to reproduce in oneself the performance skills of another can now be correlated with the Christian enterprise. As a first approximation, the Christian will be herein characterized as a disciple (student) of Jesus. This perspective is shared by the Synoptic writers who depict Jesus as calling men to follow him. The reader of St. John's gospel finds that the Christian not only follows him but believes in him, enters through him who is the Door, drinks of the water that he offers so as to thirst no more, eats of the bread which is his body, accepts him, receives him, loves him who is the Word made flesh, the Light of the world, the Way, the Truth, and the Life. Each of these phrases poetically depicts the disciple giving himself over to his master. Out of admiration grows reverence--and reverence is the proper response[1] to greatness. This reverence disposes the admirer to forego his standards of excellence and to open himself to progressively assimilate the greatness which he so admires in his master. Needless to say, when reverence is overcome by self-abasement, admiration can turn into adoration which seeks servitude[2] rather than discipleship.

Consider for a moment the position of Jesus with respect to his own times. His greatness exists as a nexus of personal performance skills. Just as in the case of the chess master, Jesus (a) cannot communicate his unique interiority in precisely formulated statements, and

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[1] SM, 96.

[2] Needless to say, Christians often have fallen into this latter self-defeating relationship to Jesus despite the absence of such patterns in the first disciples.

(b) even in the cases when he does offer verbal self-expressions, he cannot be understood unless his listener has comparable personal performance skills. Hence, we are thrown face to face with the recognition that the greatness of Jesus is largely unintelligible and unrecognizeable for the casual listener or for the antagonist. In fact, Jesus might have passed among men entirely lost in the mass of humanity if it had not been for the men and women who left aside all their other concerns for the purpose of undertaking an apprenticeship under his direction. Once again, our previous illustration of the novice in chess comes to our assistance. The novice begins with very little by way of personal powers and very much by way of admiration. An effective teacher knows how to lead his disciple from where they are into a prolonged series of ever more difficult personal integrations. The gospels retain the recollection of the confusion[1] which sometimes characterized the first disciples of Jesus; it also remembers that the disciples did succeed in sufficiently enlarging their personal powers so as to function as did Jesus among the people. The Synoptics capture this by attesting that the twelve (and also the seventy-two according to Luke) did preach the Kingdom, did cure sicknesses, and did drive out demons while Jesus lived even though he was not present at the time. The intent of such narratives (leaving aside for the moment the actual character of the skills exercized) is to grant that the disciples did actually share the same personal powers as Jesus as a result of their reverent self-giving into his hands.

Within this perspective, the practice of Christianity can now be understood as grounded upon a suitable apprenticeship. An apprenticeship requires that the disciple reverently contemplate the visible clues (speech and activity) offered by Jesus for the purpose of grasping (or being grasped by) the hidden depth of coherent meaning therein. Frequently, the disciple will misconstrue the intention of his master. In fact, the limited powers of the disciple even prompts him to project his own set of limited meanings into the clues offered by his master and to rest content at having discovered the intent of his master. At a later moment, however, the disciple will again find himself confused (just as the novice in chess previously referred to was puzzled by the next move) when his master reveals himself in a way which is incompatible with the disciple's mistaken meaning. Tacit knowing requires that every meaning must be derived from a coherence which the receiver discovers and projects onto his focal attention. Hence both error and truth have the character of projections. The fault is not with the act of projection (which is required) but with the discrepancy between the personal performance skills held by the master and the disciple. Note here that diverse communication skills are just part of the problem. When it is the case that equals are communicating, then different language histories can account for misunderstandings (as has already been illustrated). When men of vastly different powers attempt to communicate, however, misunderstanding is often generated by the simplistic significance which the lesser is apt to read into the profound utterance of the greater. In our illustration drawn from the chess tradition, it would be evident that a weak chess player would be apt to project only some version of his own weak strategy into the games played between Fischer and Spassky. In parallel fashion, it can now be asserted that only the man who shares the personal performance skills of Jesus is capable of perceiving rightly his true greatness.

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[1] Mk 6:52; 8:18; 8:33; 9:34; 10:24-26; 10:37 and parallels.

Pushing this point even further, it can also be asserted that the disciples of Jesus most probably did not attain (or surpass) his personal greatness. Something of Jesus is therefore lost in the first step of Jesus' self-giving. Likewise it can be asserted that the disciples of Jesus most probably misconstrued and misrepresented their master insofar as their apprenticeship was cut short by his death and insofar as they never matched his personal greatness. Yet, the Acts of the Apostles attest to the Christian confidence that sufficient greatness was evident in some of the disciples such that they became reliable proclaimers of their master (even though they were not exhaustive or infallible proclaimers).

The second generation of disciples is beset with the same conditions as the first. Only to the degree that the Apostles themselves can attract disciples and communicate themselves to them will the personal powers of Jesus continue to a second generation. History demonstrates that they did succeed to a reliable degree (again exhaustiveness and infallibility are unattainable).

Now another factor enters in. Just as every novice in chess schools himself in the great masters of his tradition in order to establish his independence in that tradition; so also every disciple of Jesus need establish his own independence of Jesus. And just as every novice in chess personally assimilates and makes his own the powers of his masters such that he then relies upon his personal judgment for going beyond that which his masters have explicitly taught him; so too, every disciple of Jesus must exercise his own powers of judgment so as to go beyond the explicit terms of his own apprenticeship. If this were not indeed the case, every tradition would run down due to the cumulative losses (which were spelled out in the preceding paragraph) necessitated in the transmission of a tradition. Such cumulative losses would leave a distant generation without any net gain of personal performance skills and relegate it to the banal repetition of the remembrance of a past greatness which they only vaguely understand and are almost entirely incapable of recapturing. History, however, shows that while a large number of disciples do not excel their teachers; nevertheless, some do. This can be accounted for by acknowledging that some disciples in Christianity have relied upon their own powers and gone on to surpass their teachers. St. Paul is an excellent illustration of a second generation disciple who did just this. In fact, the sparodic inbreaking of the great Saints in the Christian tradition has affirmed this as an expectation. Because of this undeniable phenomenon, the Christian tradition can be said to possess a hidden power which will intermittently raise up and nurture authentic greatness. Christians identify this hidden power as the same hidden power which first animated their founder to excel and break away from his own religious tradition. Since Jesus has been depicted as one overtaken by the Spirit of God,[1] this same Spirit is affirmed as lurking and guiding those who followed.

It should not be thought that the great Saints have somehow infallibly reproduced some of the personal performance powers lost in the transmission of the Christian tradition. Quite to the contrary, no such assurance can be given. However, it is important that the Saints have been nourished on a contact with Jesus as mediated in the chain of

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[1] Mk 1:10-12; 3:22-30 and parallels.

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master-disciple relationships stemming from Jesus. And insofar as they have been transformed in his image (which, it should be remembered is reliable without claiming to be exhaustive or infallible), then, what further transformation they experience in their lives will be attributed to the Spirit of Jesus which cast their beginnings.

Before tackling the place of God in the Christian tradition, the role of the canonical scriptures, teachers, and rituals will be briefly sketched. To begin with, no tradition can survive which does not know how to accredit its teachers and heroes. As such, Christianity has always retained some form of ordination and beatification as the necessary processes whereby the teachers and Saints (exemplars of Jesus) are identified.

With regards to the sacred rituals (especially the Lord's Supper) and canon of scriptures,[1] these are to be construed as the preserved classics which offer suitable sets of clues for the progressive formation of the Christian. The Christian gives himself over to the rituals and scriptures of his tradition fully expectant that they hold an unexpected wealth of as-yet-unapparent manifestations of the Spirit of Jesus. He is not disappointed in this expectation. The Christian is continually surprised by new discoveries just as the novice in chess is continually expanded through his repeated contemplation of the chess games of his master. By dwelling in a heuristic framework the apprentice is constantly prodded to break out into an expanded comprehension which implies a strengthening of his own personal powers in the image of his masters. From this vantage point, the rituals and scriptures of Christianity can be understood as mediating the continued presence of the Spirit of Jesus in the historical community.

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[1] These scriptures embrace primarily the New Testament writings, but also secondarily, creeds, conciliar decisions, etc., which followed.

Contemporary Christians contemplate the New Testament and find a seemingly solid confirmation of their present belief therein. They forget that they are easily led to project their own self-understanding into the clues which the scriptures offer; the cultural gap of over three hundred generations is overlooked. The translating of Greek manuscripts into English is deceiving. In fact, the original Greek of the New Testament records attests to their cultural immersion--an immersion which presupposes first century skills which can only painstakingly be reconstructed in a person separated by hundreds of intervening generations. Hence, it can be recognized that the clues offered in the New Testament relative to the personal powers of Jesus were effective for the communities in which the requisite shared skills were present (i.e., the communities which shared the same culture and commitments as their authors), but that such clues become increasingly obscure with the passage and transmutation of Western culture. The disciples of every age, therefore, were either beset with rotely repeating the increasingly obscure and ineffectual clues of the primitive documents or, convinced that they themselves had correctly assimilated the powers bequeathed by Jesus to his original disciples, they proceed to express and evoke those powers in terms consonant with the shared cultural skills prevalent in their times. This later option seems to best fit our historical data. The gospel attributed to St. John already attests to the Hellinization of the Palestinian Christianity. And St. Augustine cast Christianity within Neo-Platonic perspectives that gained nearly universal acceptance throughout the Roman Empire. The writings of Augustine would be scarcely

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intelligible to someone in the community which originated Matthew's gospel; and one suspects that the Gospel according to St. Matthew was already scarcely intelligible to St. Augustine. The reliability of the self-revelation of Jesus which grasped Augustine is to be found only in the chain of uninterrupted discipleship which transmitted and transmuted the personal powers of Jesus from generation to generation. Thus the actual Christianity of Augustine is a distant relative of the Christianity of the Apostles. If Christianity had not been transmuted at every stage of its transmission, it would come to us as only a confusing and meaningless account of a first century prophet-exorcist-healer. It cannot be shown precisely at this time however to what extent the powers of Jesus can be garnished reliably through the media of imperfect and defective series of discipleships. Nor can it be precisely shown how the great saints and teachers engendered by the spiritual resources of Christianity have indeed enhanced and augmented[1] the personal powers attributed to the historical Jesus. Those who embrace Christianity do so under the assumption that enough of the charisma of the founder is present to warrant and accredit participating within the present structures of this or that particular community which claims discipleship to Jesus. Needless to say, no strictly objective criteria can be offered which would judge and correct the belief and

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[1] It is probably the case that Jesus will retain the central position of the New Man in Christianity even though that image has been transformed with the growth and development of the Christian tradition. This projection of the greatness of the Saints back into the historical Jesus allows the Christian tradition to have a unified center of focus which gathers up the best of an expansive historical tradition. As has already been noted, this projection is not strictly legitimate--the intensity which it promotes, however, certainly makes its continuation meritorious.

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praxis of any of the various churches. Any church which sets itself up as the norm for all others is a victim of a dangerous delusion. Individual churches can rightly claim that they have dedicated themselves to reproduce the dispositions of Jesus and to perpetuate the sacred obligations which he undertook without arrogantly confusing their parochial understanding with the understanding and practice of Jesus himself. In fact, the very existence of diversity within the canonical scriptures should lead Christians to affirm an authentic diversity between and within Christian communities.

In contrast to the apprenticeship which a novice at chess undertakes from his masters, the degree of self-surrender and passionate self-transformation implied in Christian conversion far exceeds that necessitated by the assimilation of chess strategy. The novice at chess is led to assimilate the powers of his masters and his admiration for their skill gives them power over him. The disciple is similarly situated with respect to Jesus. His admiration (which incorporates elements of worship as will be shown in a moment) does not hold for only one arena of life (that of the chess tournament) but diffuses itself into every arena. Thus, throughout this section, the Christian has been spoken of as one who assimilates the personal powers of Jesus. Our assumption here is that Christianity has little to do with privileged information passed down as revealed divine mysteries. Rather, our assumption here is that the personal self-revelation of Jesus constitutes what his disciples would come to regard as a compelling disclosure of that-man-whom-God-enables-each-of-us-to-become. Hence the Christian is admonished to follow Jesus. The following of a man--the self-giving necessary for apprenticing oneself to reproduce his dispositions and perpetuate his superior obligations--this becomes for the Christian the highest calling of man--a calling which is specified in terms of a divine vocation. How this can be understood will now be taken up.

(c) Finally, our attention is turned to the relationship of discipleship to Jesus and obedience to God. Here again the revelation of personal interiority from one person to another will serve our purposes. The Judeo-Christian tradition is founded upon the understanding that God (who Himself stands outside of creation) reveals Himself in creating. Hence, the enabling and hindering powers of the cosmos were understood as expressions of God's ordinances. God was experienced as directly expressing Himself in agricultural, meteriological, and social events. Progressively Western man has recognized that such events have a much larger degree of autonomy than was formerly expected. Jeremiah, for instance, affirms the living God as the One-who-thunders, the One-who-raises-clouds, the One-who-brings-winds, and consequently, as the One-who-withholds-the-showers because of the sins of men.[1] Needless to say, such atmospheric processes are no longer attended to as clues to God's presence by the larger part of contemporary Christians. In parallel fashion, agricultural and political powers have been desacrilized. Jeremiah, for instance, finds God's punishment to be meted out by the armies of Nebuchadnezzar.[2] Most contemporary Christians would hardly allow that God so disposed the process of history as to reveal himself through the acts of kings.

In recognition of the tacit powers of perception operative in contemporary society, the foregoing dissertation has found it congenial to expand Polanyi's cosmic field as a credible presentation of the traditional God-who-creates-the-heavens-and-the-earth. More especially, it was suggested that God was the ordering principle of innovation which guided evolution through all its phases up to and including the responsible personhood of man. Within this perspective, Jesus was presented as making manifest that-man-whom-God-enables-every-man-to-become.

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[1] Jeremiah 10:10-15 and 3:3.

[2] Jeremiah 4:6; 14:12; and 24:10.

When Jesus is understood as that-man-whom-God-enables-all-men-to-become; this means that the personal revelation of Jesus to his disciples is equivalent to a disclosure of God's new initiative in history. Discipleship therefore implies the fulfillment of divine obligations directed toward the self-transcendance of man. Or put differently, if God's project in the world is the creation of man, following Jesus (as the breakthrough initiated by God) then is harnessing one's personal initiatives to divine initiatives. Needless to say, Jesus is only the first fruits of a whole tradition of greatness. He need not be the best, but he assuredly is the normative beginning. Through him every man is called to greatness in the image of Jesus and his Saints. Suffice it to say that Jesus, as the New Man created by God, provoked an irreducible tension with regards to how man is to understand himself as constituted by God. To follow Jesus then means to undertake the same transcendent obligations and to sustain the same standards of excellence as he exemplified.

On the basis of the foregoing, however, Christianity seems to be a tradition which trains its participants to discern and assimilate human greatness. Can this really be construed as fulfilling divine obligations? Here again, it must be emphasized that the faith perceptions engendered in the Christian community cannot be demonstrated or objectively shown to the uninitiated. God exists for the Christian insofar as he has schooled himself to recognize divine initiatives in the world. And the Christian situates Jesus as the central divine initiative which makes God's own intentionality visible.

Christianity, in the final analysis, emerges as the development of a long tradition bent upon serving a cosmis apprenticeship. Primitive peoples were able to relate to the world as the grand gesture of God. They reverently contemplated the patterns of nature and discerned therein how to most effectively harmonize their activities with the creative agricultural powers. The planting of the dead seed was prepared for by ceremonial washings and sexual rites thereby demonstrating that they were disposing themselves to undertake their part in higher obligations. At the harvest, the fields were again suitably cared for by rites (a) which acknowledged in gratitude the powers of the field, and (b) which sought to aid the fields to regain their spent energies during the sleep of winter. Nothing less than a cosmic apprenticeship is evident here.

Christianity is the distant relative of such primitive engagements. It affirms that the primitives were often mistaken in addressing agricultural powers as God but that they were right in discerning that the cosmos itself does offer suitable clues to discern a transcendent set of obligations which stand as an unfailing source of mutual blessings. A long train of Jewish discoveries corrected agricultural religion and raised men to perceive a single transcendant God who showed himself in the manifold events of cosmic and social history. Christianity pushed this cosmic apprenticeship even further when it identified Jesus as the fullness of the revelation of the invisible powers of cosmic creativity. Jesus is the crown of creation and God's initiative is discerned as the transformation of all men in the image of the New Man. The Christian, therefore, finds in the human revelation of greatness in the personal powers of Jesus the full image of God's initiative in the world. Christians, therefore, submit themselves to achieve in their own lives a dedication to the purposes which Jesus began (fitting themselves with the same standards of excellence), fully convinced that they are thereby harmonizing their activity of divine purposes which is the source of God's blessings.

The Christian God can now be compared to the Master who takes the cosmos on as His apprentice. Bit by bit the cosmic stuff endeavors to assimilate as its own the performative skills of its Master. After terribly long struggles, life appears as the cosmic achievement. Yet, the Master has more to offer. Responsible personhood emerges. And still more: Jesus appears as the one who does what he sees the Father doing. And in like fashion, his disciples (following him) open their lives to an indeterminate series of future manifestations of the great powers which the Master intends for those who love Him.

APPENDIX:

A SHORT BIOGRAPHY OF MICHAEL POLANYI

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APPENDIX:

A SHORT BIOGRAPHY OF MICHAEL POLANYI[1]

Michael Polanyi's (1891 -) formal training was in medicine and chemistry; he holds doctorates in both fields from the University of Budapest (1913 and 1917 respectively). His philosophical interests were born out of the pressing political and social questions of his day. With the rise of Hitler, Polanyi left his post (1920-33) at the Kaiser Wilhelm Institute for Physical Chemistry; and, soon thereafter, accepted a position at Victoria University, Manchester. While in England, Polanyi gave careful attention to the rising political regimentation of scientific thought in both Germany and the U.S.S.R. Polanyi's third visit to the Soviet Union in 1935 led to extensive talks with N. I. Bukharin regarding the Marxist ideal for the experimental sciences. Consequent[2] upon these talks and consequent upon a movement by the British Association for the Advancement of Science in 1938, Polanyi began his own quest for an adequate justification for the free pursuit of science in society. Becoming politically active, Polanyi founded the Society for the Freedom of Science in 1938, he lectured and published widely in the belief that the pursuit of truth ought to regulate science and not political-economic interests.[1] In 1947 he received an invitation to present the Gifford Lectures. In 1948 he transferred from the department of physical-chemistry to that of social studies at the University of Manchester. Meanwhile, he participated in the biannual meetings (1939-53) of The Moot, a prestigious interdisciplinary society sponsoring informal discussions of the pressing issues of the day. As a consequence of his increasing interest in social concerns, Polanyi has worked out, during the last dozen years, a synthetic philosophy designed to show that all man-made cultural enterprises (science, government, art, religion) rely upon similar organismic, sociological, and epistemological processes.

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[1] For the following biographical insights, I am indebted to the personal interviews of Richard L. Gelwcik which are referred to in his unpublished Th.D. dissertation, Michael Polanyi: Credere Aude, his Theory of Knowledge and its Implications for Christian Theology (Berkeley: Pacific School of Religion, 1965), pp. 6-11, 16-19, 32-38.

[2] The personal importance of these events is singled out by Polanyi himself in his 1963 introduction added to his 1945 Riddell Memorial Lectures which were published as Science, Faith, and Society in 1946.

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[1] For a listing of his lectures and publications, 1935-68, cf. T. A. Langford and W. H. Poteat (eds.), Intellect and Hope (Durham, N.C.: Duke University Press, 1968), pp. 432-436.

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